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Editor

K. N. DIKSHIT

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OBITUARIES

S. P. Gupta
(1931-2007)

Dr. Swarajya Prakash Gupta, younger son of late Shri Onkar Nath and late Smt. Saraswati Devi, was born on 22nd December 1931 at Allahabad. His father, who was a freedom fighter during Nehru's time at Allahabad, died at an early age and there was none to look after him except his mother and maternal grandfather from Itawah (UP.), who supported his education in the University and elsewhere. This led him to take deep interest in higher studies. Initially he tried to become an IAS officer but eventually History and Archaeology became special area of his interest. He was educated and associated with different Universities in India and abroad. He earned his degrees of M.A., L.L.B., Ph.D. and DLitt. from Allahabad, Delhi and Magadh Universities respectively. He also obtained Certificate in Museology from 'Ecole de Louvre Paris and Musee rie L Homme', Paris, Govt. of France. He secured first position with Credit in Diploma in Archaeology from the Institute of Archaeology, New Delhi and was awarded Wheeler prize for excellence in the Field of Archaeology. He was also awarded Maulana Azad and Centenary Commemoration Gold Medals for excellence in Archaeology. He also obtained certificate of Merit in Environment Archaeology from the Institute of Archaeology, University of London.

After completing his studies, Dr. S.P. Gupta joined the Archaeological Survey of India at Nagarjunkonda (Andhra Pradesh). Thereafter he worked in the Atlas Branch of A.S.I. at Nagpur. Then, he served National Museum, New Delhi as Deputy Keeper and later rose to the rank of Assistant Director.

Dr. S.P. Gupta was a leading Art historian, a distinguished scholar of Museology and a well-known expert of Harappan Archaeology. I have never seen him thinking and doing anything else other than Archaeology, which led him to dream and build a Centre of Higher Learning, which finally culminated in the development of the Centre for Research and Training in History, Archaeology and Paleo-Environment. The Centre presently houses a large number of books on Indian Archaeology and students and scholars from all over the World frequently come and sit here to carry out their archaeological research.

Dr. S.P. Gupta was invited to become Director of the Allahabad Museum where he served for a period of two years. During his tenure this Museum became one of the best Museums of the Country and also attained the status of a National Museum.

Dr. Gupta after his superannuation came back to Delhi and took keen interest in the development of Indian Archaeological Society and also established Centre for Research and Training in History, Archaeology and Paleo-Environment and Indraprastha Museum of Art and Archaeology in the present premises of Indian Archaeological Society, New Delhi.

Dr. S.P. Gupta wrote several books on Indian Art and Archaeology. Some of his pioneer books are *Disposal of the Dead and Physical Types in Ancient India* (New Delhi, 1971), *Tourism, Museum and Monuments* (New Delhi, 1975), *Archaeology of Soviet Central Asia and the Indian Borderlands* (New Delhi, 1978) 2 Volumes, The *Roots of Indian Art* (New Delhi, 1980), French Edition of this Book was published in Paris, 1990, *The Indus-Saraswati Civilization* (New Delhi, 1996), *The Elements of Indian Art* (New Delhi, 2002) and *Cultural Tourism in India* (New Delhi, 2002).

He also edited several books entitled *India's Contribution to World Thought and Culture* (Madras 1972), *Mahabharata: Myth and Reality-Differing Views* (New Delhi, 1976), *Frontiers of the Indus Civilization* (New Delhi, 1983), *Kushana Art of Sanghol* (New Delhi, 1986) and *Masterpieces of the National Museum Collection* (New Delhi, 1986).

Dr. S.P. Gupta was a widely travelled scholar covering as many as 32 countries in the World. Besides the aforesaid books; he also contributed more than 100 articles on Indian Art and Archaeology, which are still the source of information on archaeology for the scholars and student alike. Although, he was not well, yet he was trying to complete several projects, which were in his hands but couldn't see the light of the day due to his sudden demise. These comprised of books entitled *Atlas of the Indus-Saraswati Civilization in 4 Volumes, Scientific Investigation of the Lost Saraswati River, Elements of Indian Temple Architecture, A Comprehensive Study of Indian Archaeology, Practical Dictionary of Indian Icons* and *Modern Museum Management.*

I have no words to praise him for his deep interest in Indian History, Culture, Art & Archaeology. Although, the deep void in our lives can never be filled, his memories are immortal in our hearts. His noble thoughts, high ideals, love inspiring words and caring advise will continue to guide us in every moment of our lives. He will stay alive in our thoughts forever. He was a great visionary, philanthropist and a novel soul. With tears in my eyes and high respect in my heart, I can only say that he was a man *Born for Archaeology* and the father figure of Modern Archaeology in the country.

Arun Kesarwani

M. C. Joshi
(1935-2007)

Born on 30th March 1935 at Haldwani in Uttrakhand, Munish Chandra Joshi had his early education in Nainital. He passed Master of Arts in History with distinction from the Lucknow University in 1956 and was also awarded gold medal. The same year he joined the Archaeological Survey of India (ASI) as a guide lecturer and was posted at Ajanta. This posting provided him the required impetus to pursue his interest in Indian art and architecture. After holding different positions in ASI, he was appointed as the Director General of ASI. In 1993, he retired from ASI and joined the Indira Gandhi National Centre for the Arts (IGNCA) as its Member-Secretary and served in this position till 2000. While in ASI, he carried out archaeological investigations in different parts of our country and made in-depth study of monuments and museum collections. He had also carried out excavations at Purana Qila and Mathura.

Munish Chandra Joshi was also associated with several Indian and foreign universities as a distinguished scholar and visiting professor and was invited to give lectures and seminars on different aspects of Indian culture, history and archaeology.

Munish Chandra Joshi had published over 200 research papers covering almost every aspect of Indian art, architecture, archaeology, history and culture. He wrote in English and in beautiful and almost mellifluous Hindi. From epigraphy and numismatics to iconography and iconology, painting, rites and rituals, myths and traditions, tantra, social systems, Sufism, art and architecture from the earliest times to the colonial period, conservation of monuments, astrology, gems and jewellery – there was hardly any area which did not come under his purview. His papers and interventions on theoretical concepts and issues are equally important. His guide-book, *Dig*, published by ASI and the Taj-Mahal (with Amina Ahuja as co-author), *Itihas ke Sandarbha mein Sakta Tantra (Sakta Tantra in Historical Perspective)* and King Chandra and Mehrauli Inscriptions (co-edited with S. K. Gupta) are his other works.

Just before his death, as the commissioner he had completed work on the exhibition 'The Golden Age of Classical India: The Gupta Empire' held at Galleries nationals du Grand Palais, Paris, in France from April 4 to June 25, 2007

He passed away on 1st January, 2007. For me it is a personal loss since I always looked up to him as my mentor and guide.

B.M. Pande

A.N.Tiwari
(1925 -2007)

A.N.Tiwari, eminent bureaucrat, social activist and President of the Confederation of Citizens Associations, a body working for Urban Development and Civic Infrastructure passed away in Bhubaneswar in the early hours of friday, the 18th of October, 2007. He was 82.

Tiwari was born on 5th December, 1925 in Khariar (District Nuapada). He did his schooling from C.S Zilla School, Sambalpur. He passed his graduation from Ravenshaw College, Cuttack. He was known from his public speaking skills. He won the Chancellor prize for debate twice. He joined as a Deputy Collector in 1950 and served in many important assignments in the Departments of General Administration, Industry, Culture, Tourism, Agriculture, Rural Development and Irrigation. He was the first Chairman of the Notified Area Council of Bhubaneswar and the first Director of Estates. He is remembered for his pioneering efforts in development of Tourism in Orissa.

A writer of eminence, he is known for his monumental compendium on Orissa titled *Reference Orissa* and his autobiography *All in a Stride – Reflections of a Civil Servant.* He received Rajiv Gandhi Award for Best Citizen. Chief Minister Shri Naveen Pattanaik in his condolence message aptly describes Tiwari as a multi-faceted personality.

Though a bureaucrat he understood the problem of cultural heritage, and got extended all the possible help from Govt.of Orissa to ASI in carrying out the conservation work of Lord Jagannath Temple and also acquiring land for the development of monuments in Bhubneswar and also Konark. We remember him for his unflinching support till he breathed his last.

P.K. Trivedi

PURĀTATTVA

Number 37 2007

Editorial

While planning the present issue of the Puratattva which, as usual, carries the articles from prehistory to mediaeval times, I was struck by the non-availability of new excavated material since new projects were not taken up by the Archaeological Survey of India which laid stress on the completion of pending excavation reports. At the same time, I thought of the field-work carried out by Universities, State Departments of Archaeology and other Research Institutions who not only continued their ongoing works but also undertook new projects. The articles that we have in this issue will evoke interest: it opens with an Inaugural Address delivered by Prof. B.B. Lal in July 2007 at South Asian Archaeological Conference at Ravenna, Italy, namely 'Let not the 19th century paradigms continue to haunt us' and also contains a number of review articles specially on the Chalcolithic sites from eastern India as well as Gujarat. The problem of the Ochre Colour Ware and Copper Hoards has also been touched. Then there are articles dealing with the historical period, such as the one relating to the excavations at Sisupalgarh which has revealed further details of the township. Agiabir in the Gangetic valley was put to further excavation. An article on the study of rock-art in western Himalayas is also there.

This issue also contains an article on temples from Mari Indus, Pakistan, revealing the distinctive architectural tradition of temples during 8th century in that region, whereas the survey of Sundarbans revealed archaeological wealth in that area of Bangladesh. A comparative study of the painted designs on the chalcolithic pottery of Iran and India was a joint attempt of archaeologists from Iran and India. Outside the Indo-Pak subcontinent, we have a report on the joint Italian-Mongol geoarchaeological project in the valley of lakes Gobi Altyan region along with an appendix on mineralogical and pollen analyses of the deposits from Orog Nuur lake, Mongolia. A special project report on the excavations at Sirpur, Chhattisgarh, especially on its town-planning has been published separately.

Perhaps mention may be made of the handling of the Sethusamudram project which in its present form envisages the cutting of the Ram Setu, because it lies on the path of the proposed canal. NEERI has done the environmental assessment of the project along with the alignment of the canal, whereas Archaeological Survey of India has made no such efforts to make a cultural assessment, although it has the necessary infrastructure and working arrangements to carry out the same. It would be desirable to carry out underwater investigations of the area in collaboration with Indian Institute of Oceanography and also Maritime section of Indian Navy. In addition, the data of 150 years (1842-1995) showing depressions, cyclones and hurricanes should be examined and utilized for understanding the offshore behaviour of the waves. Scientific investigations should also be carried out to ascertain the regional sea-level changes.

The publication of this issue was possible due to the generous financial assistance from the Indian Council of Historical Research and the Archaeological Survey of India. We are grateful to both these organisaitons. In respect of the articles and notes, contributed by different authors, the Indian Archaeological Society is in no way responsible for the views expressed by them. Those are the personal views of the authors.

We take this opportunity to thank the team and other colleagues who have helped to put this issue together by sharing the burden of selection of articles, notes and book reviews. Shri J.P. Joshi, Dr. S.S. Biswas, Dr. B.R. Mani and Shri O.P. Tandon shared the responsibilities in various ways and of course Prof. B.B. Lal was always there as a guiding force. Dr.(Ms.) Mukta Raut Dey and Shri Vinay Kumar took all the responsibility of making the manuscript press-ready within acceptable limits. Ms. Jyoti Bhargava, Shri Tejas Garge and Ms. Sulekha helped in proof-reading. Other members of the Society, Sarvashri Rakesh Dutta, J.N. Khera, Bharat Singh and M.S. Mani have equally helped in preparing the type-script. Ms. Raj Rani Sharma, the Librarian, provided the missing references. Shri Madneswar Trivedi, Director Administration, provided all logistic support. They deserve grateful thanks.

Forty years ago, the Indian Archaeological Society was established at BHU, Varanasi, and within three years it shifted to Delhi and finally made it permanent headquarters at B-17, Qutab Institutional Area, New Delhi 110016. This dream was realized through a bold step by Dr. S.P. Gupta, a visionary, who left us on the night of 3rd October 2007 after a prolonged illness. We have no words to mourn his loss to archaeological fraternity. He will always be remembered as a source of inspiration and for the creation of an excellent Centre for scientific development of archaeological researches in India.

Finally, thanks are due to Ms. Anita Mehta of Aquarelle, Ms. Swaraj Davra and members of their staff for bringing out this issue in time.

KND

Let not the 19th Century Paradigms Continue to Haunt us**

B. B. Lal*

I am most grateful to the organizers of this conference, in particular to the President, Professor Maurizio Tosi, not only for inviting me to participate in this Conference but also for giving me the additional honour of delivering the Inaugural Address. Indeed, I have no words to thank them adequately for their kindness. Perhaps this is the first occasion when a South Asian is being given this privileged treatment by the European Association of South Asian Archaeologists.

The conference hall is full of scholars from all parts of the world – from the United States of America on the west to the Land of the Rising Sun, Japan, on the east. All these scholars have contributed in a number of ways to our understanding of the past of South Asia, and I salute them with all the humility that I can muster. However, I hope I will not be misunderstood when I say that some amongst us have not yet been able to shake off the 19th-century biases that have blurred our vision of South Asia's past.

As is well known, it was the renowned German scholar Max Muller who, in the 19th century, attempted for the first time to date the Vedas. Accepting that the *Sutra* literature was datable to the 6th century BCE, he gave a block-period of 200 years to the preceding three parts of the Vedic literature, namely the *Aranyakas, Brahmanas* and *Vedas*. Thus, he arrived at 1200 BCE as the date of the *Vedas*. However, when his contemporaries, like Goldstucker, Whitney and Wilson, objected to his ad-hocism, he toned down, and finally surrendered by saying (Max Muller 1890, reprint 1979): "Whether the Vedic hymns were composed [in] 1000 or 1500 or 2000 or 3000 BC, no power on earth will ever determine." But the great pity is that, in spite of such a candid confession by the savant himself, many of his followers continue to swear by his initial dating, viz. 1200 BCE.

The ultimate effect of this blind tenacity was that when in the 1920s the great civilization, now known variously as the Harappan, Indus or Indus-Sarasvati Civilization, was discovered in South Asia, and was dated to the 3rd millennium BCE , it was argued that since the Vedas were no earlier than 1200 BCE, the Harappan Civilization could not have been Vedic. Further, since the only other major linguistic group in the region was the Dravidian, it was held that the Harappans were a Dravidian-speaking people.

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*Former Director General, Archaeological Survey of India.

**Inaugural Address, delivered at the 19th International Conference on South Asian Archaeology, held at University of Bologna, Ravenna, Italy on July 2-6, 2007.

Then came the masterstroke. In 1946, my revered *guru* Mortimer Wheeler (later knighted) discovered a fortification wall at Harappa and on learning that the Aryan god Indra had been referred to as *puramdara* (destroyer of forts) he readily pronounced his judgment (Wheeler 1947: 82): "On circumstantial evidence Indra [representing the Aryans] stands accused [of destroying the Harappan Civilization]." In further support of his thesis, he cited certain human skeletons at Mohenjo-daro, saying that these were the people massacred by the Aryan invaders. Thus was reached the peak of the 'Aryan Invasion' theory.

And lo and behold! The very first one to fall in the trap of the 'Aryan Invasion' theory was none else but the *guru*'s disciple himself. With all the enthusiasm inherited from the *guru*, I started looking for the remains of some culture that may be post-Harappan but anterior to the early historical times. In my exploration of the sites associated with the Maha–rata story I came across the Painted Grey Ware Culture which fitted the bill. It antedated the Northern Black Polished Ware whose beginning went back to the 6th-7th century BCE, and overlay, with a break in between, the Ochre Colour Ware of the early 2nd millennium BCE. In my report on the excavations at Hastinàpura and in a few subsequent papers I expressed the view that the Painted Grey Ware Culture represented the early Aryans in India. But the honeymoon was soon to be over. Excavations in the middle Ganga-valley threw up in the pre-NBP strata a ceramic industry with the same shapes (viz. bowls and dishes) and painted designs as in the case of the PGW, the only difference being that in the former case the ware had a black or black-and-red surface-colour, which, however, was just the result of a particular method of firing. And even the associated cultural equipment was alike in the two cases. All this similarity opened my eyes and I could no longer sustain the theory of the PGW having been a representative of the early Aryans in India. (The association of this Ware with the Mahabhàrata story was nevertheless sustainable since that event comes at a later stage in the sequence.) I had no qualms in abandoning my then-favourite theory.

But linguists are far ahead of archaeologists in pushing the poor Aryans through the Khyber/Bolan passes into India. In doing so, they would not mind even distorting the original Sanskrit texts. A case in point is that of the well-known Professor of Sanskrit at the Harvard University, Professor Witzel. He did not hesitate to mis-translate a part of the *Baudhayana Srautasutra* (Witzel 1995: 320-21). In 2003 I published a paper in the *East and West* (Vol. 53,Nos. 1-4), exposing his manipulation. Witzel's translation of the relevant Sanskrit text was as follows:

> Ayu went eastwards. His (people) are the Kuru-Pancalas and Kasi - Videhas. This is the Ayava (migration). (His other people) stayed at home in the west. His people are the Gandhari, Parasu and Aratta. This is the Amavasava (group).Whereas the correct translation is:

> Ayu migrated eastwards. His (people) are the Kuru-Panchalas and Kasih Videhas. This is the Ayava (migration). Amavasu migrated westwards. His (people) are the Gandhari-, Parsu and Aratta. This is the Amavasu (migration).

According to the correct translation, there was no movement of the Aryan people from anywhere in the north-west. On the other hand, the evidence indicates that it was from an intermediary point that some of the Aryan tribes went eastwards and other westwards. This would be clear from the map that follows (Fig. 1).

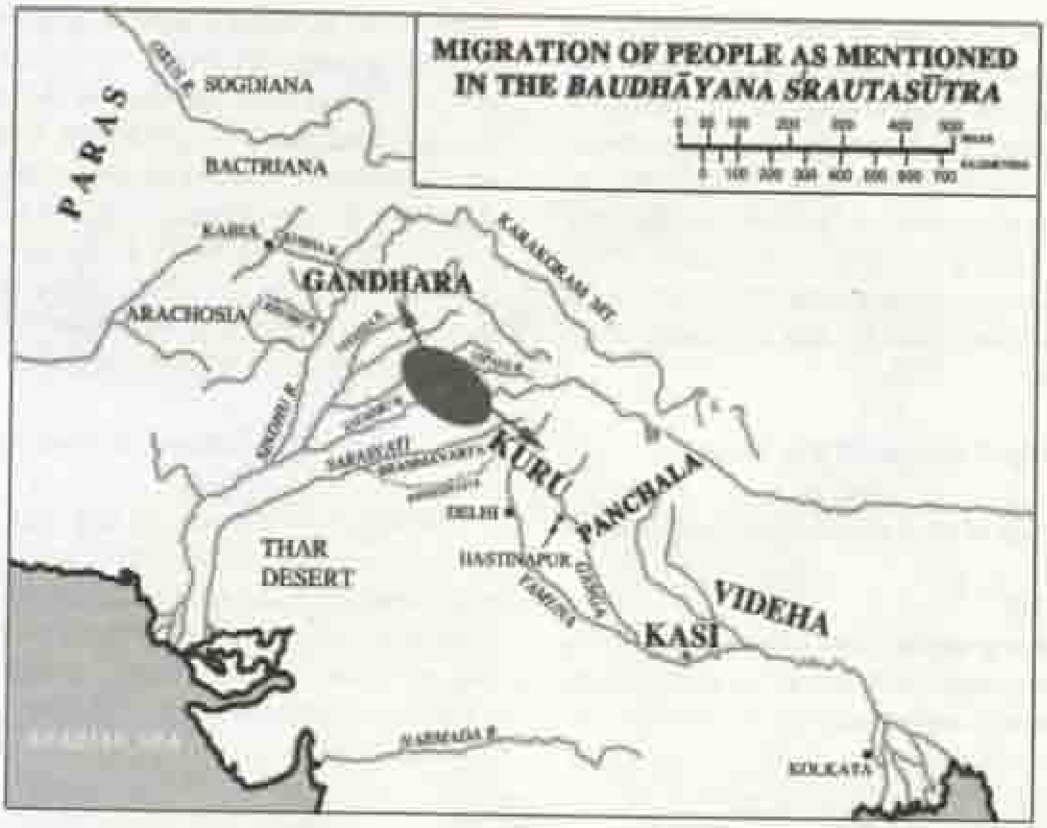


Fig.1

Professor Witzel and I happened to participate in a seminar organized by UMASS, Dartmouth in June 2006. When I referred, during the course of my presentation, to this wrong translation by the learned Professor, he, instead of providing evidence in support of his own stand, shot at me by saying that I did not know the difference between Vedic and Classical Sanskrit. Should that be the level of an academic debate? (Anyway, he had to be told that I had the privilege of obtaining in 1943 my Master's Degree in Sanskrit (with the *Vedas* included), with a First Class First, from a first class university of India, namely Allahabad).

To revert to the theory of 'Aryan Invasion'

The year 1964 saw this theory being pushed back in the reverse gear. George F. Dales published a paper in which, after presenting a thorough analysis of the evidence, he completely lambasted the massacre theory and, in a way, rescued Indra from the charge of having been a marauder. Since then many other scholars (e.g. Danino 2006, Kenoyer 1998, Lal 2002 and 2005, Renfrew 1988, Shaffer and Lichtenstein 1999) have adduced further evidence to add successive nails on to the coffin of the 'Aryan Invasion' theory.

Unfortunately, however, the ghost of 'Aryan Invasion' is not buried deep enough. It is being resurrected in the form of 'Aryan Immigration', and in this context the Bactria-Margiana region is said to be the source. Out of the scholars who stand by this rejuvenated thesis, I shall deal here with four representative ones, namely Professors Romila Thapar and R. S. Sharma from India and Professors Asko Parpola and V. I. Sarianidi from the West.

But before the views of these four scholars are examined it seems appropriate to spell out in some detail the nature of the Bactria-Margiana Archaeological Complex (BMAC), even though some of the scholars present here may be familiar with it. I would also like to take this opportunity to heartily congratulate Professor Sarianidi and other archaeologists whose sustained field-work has placed the BMAC on the same high pedestal as occupied by other civilizations of the ancient world.

Characteristic Features Of The Bmac

First, a map of the region involved is given below (Fig.2):

It is now proposed to discuss, though very briefly, the following features of the BMAC: (i) town-planning and monumental architecture; (ii) the ceramics; (iii) stone objects; (iv) metal objects; (v) sculptural art; (vi) seals and amulets; and finally (vii) the chronological horizon. This seemingly uncalled for exercise is being done in order to demonstrate that (a) the BMAC people were not nomads, as held by my Indian colleagues; and (b) these characteristic features of the BMAC never ever reached east of the Indus up to the upper Ganga—Yamuna- *doab* – an area which was the homeland of the Rigvedic people, as is clear from the *Nadi-stuti* verses (10.75.5 and 6) of the *Rigveda* itself.

(i)Town-planning and Monumental Architecture

The BMAC settlements, by and large, were well planned and contained monumental structures. This is abundantly clear, for example, from the excavated remains at Dashly-3, in Bactria, where a 'cultic centre' has been found located within a series of three successive fortifications. The cultic centre, circular on

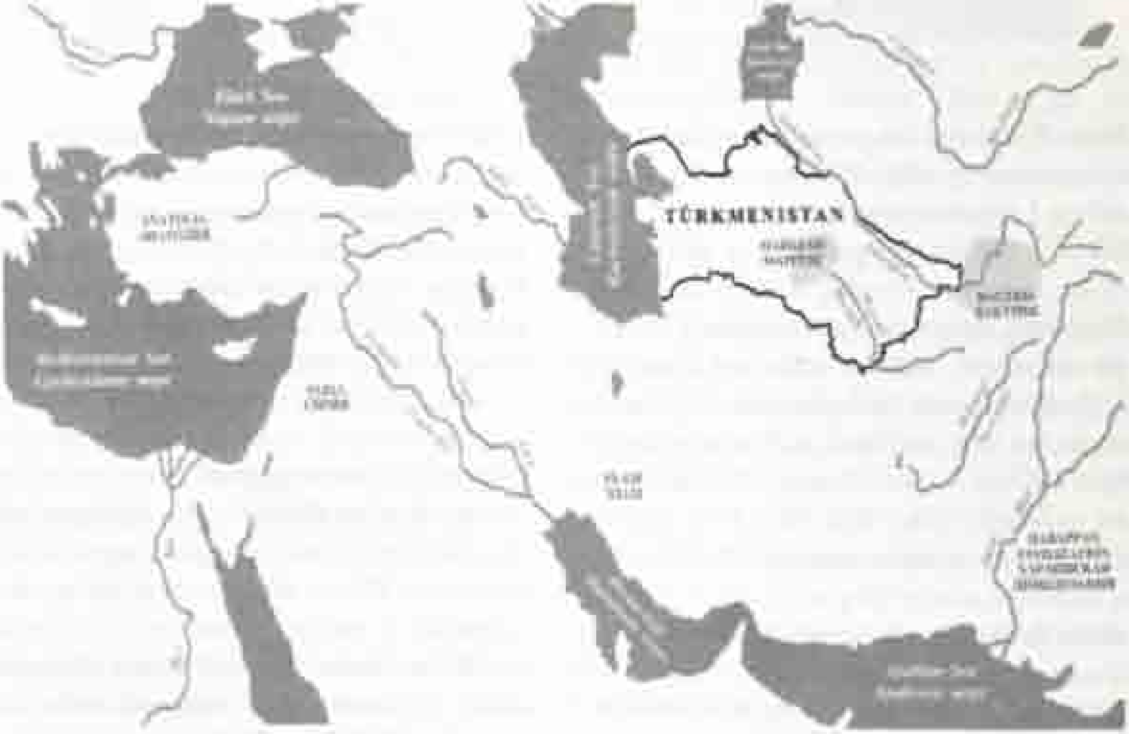


Fig. 2: Region of Bactria- Margiana Archaeological Complex

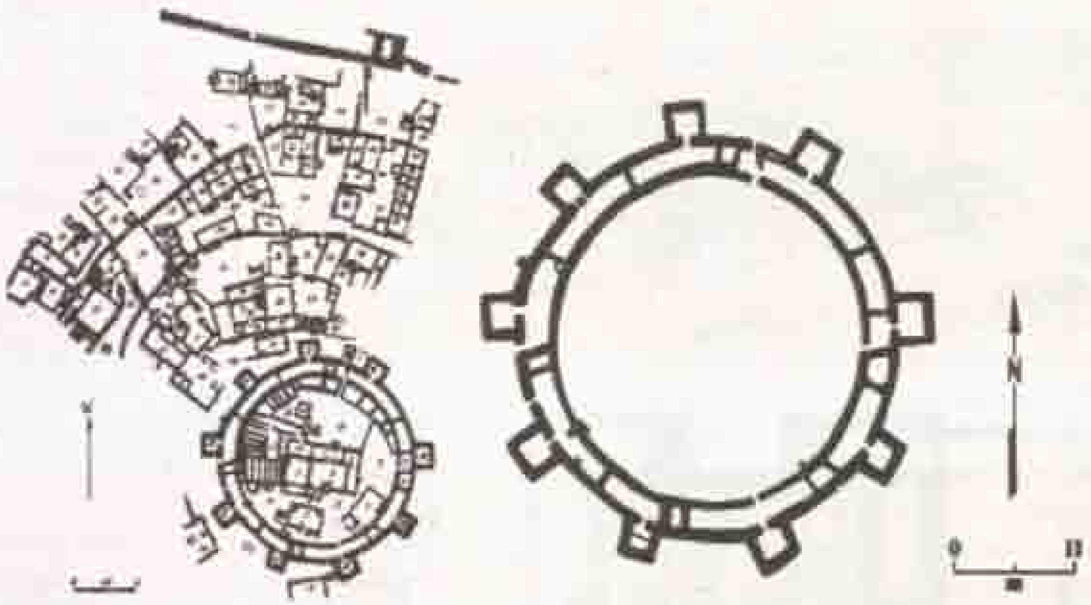


Fig. 3: Temple at Dashly- 3 Bactria

plan, with a diameter of 40 metres, was provided with nine square bastions on the exterior (Fig.3).

In Margiana, excavations at Togolok-1 and Togolok-21 have yielded the remains of multi-roomed temples, of which that at the latter site is more elaborate. Covering an overall area of about 1.5 hectares, the Toglok-21 complex had in the centre a 60 x 50 m. unit enclosed by a 5-m. thick wall which was provided on its exterior with four circular towers, one at each corner and two semi-circular towers, one each abutting the exterior of the eastern and western walls. This central unit had two more enclosure walls at successive distances, which too were provided with circular towers at the corners and semi-circular towers along the walls (Fig.4).

Besides the foregoing temples, at Gonur (also in Margiana) has been brought to light a massive architectural complex of secular nature. Called variously as 'Citadel' or 'Kremlin', it measures 120 x 115 m. on plan and is enclosed by a fortification wall, having on the exterior a rectangular tower at each corner and four rectangular towers on each side. Here is the plan of the 'Kremlin' which incorporates within its premises the king's palace, audience hall, administrative blocks, garrison complex, etc. (Pl.1).

(ii) The Ceramics

Many of the BMAC settlements have yielded remains of pottery kilns, having a lower 'fire-chamber' and an upper 'baking chamber'. The pot-forms include, besides others, large carafes with stretched narrow necks, vases with long slim stems and 'tea-pots' with spouts. The spouts themselves show a great variety, which includes 'long tubular' spouts, 'bridge' spouts and 'trough or channel' spouts (Pl.2).

Besides these distinctive spouted vessels, there is yet another category which calls for special attention. It is a basin or bowl having a frieze of small animals (sometimes humans as well) running along the rim. Also to be noted are serpents crawling up along the walls of

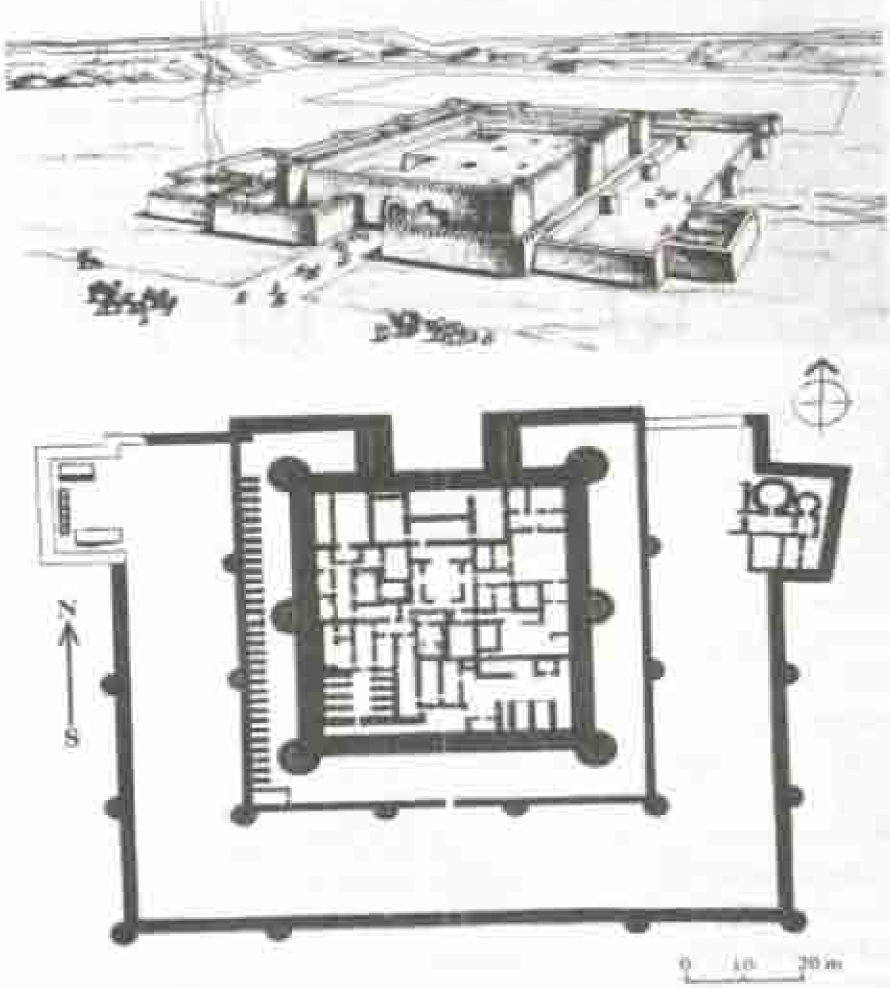


Fig. 4: Temple at Togolok-21, Margiana

the pot, both on the exterior as well as interior (Pl.3). Although there is no conclusive contextual evidence to establish their 'ritual association', it has been surmised that these bowls may still have had such a use, primarily because the animal-cum-human frieze on the rims would render the bowls rather uncomfortable for the lips to directly drink a liquid from the bowls.

(iii) Stone Objects

There is a great variety of stone objects in the BMAC: for example, beads and pendants of carnelian, lapis lazuli and turquoise, carved vessels of steatite, 'diminutive columns' of multi-coloured stones and seals and amulets of steatite.

The illustration that follows shows a cup-on-stand and a deep inward-tapering bowl of black steatite. Both these bear etched geometrical designs on the exterior (Pl.4).

The 'diminutive columns', also known as 'dainty columns' or 'dainty pillars', are generally less than half-metre in height, highly polished and sometimes providedwith a vertical groove. While their exact use is debated, it has been suggested by certain scholars that these were used in some kind of ritual (Pl.5).

(iv) Metal Objects

The BMAC settlements, including graves, have yielded a large number of metal objects, mostly of bronze/copper but sometimes of silver and gold too. Here we illustrate two very distinctive axes. On one of these there sits a human figure at the butt-end, whereas in the other case that position is occupied by an animal (Pl.6).

However, much more remarkable is an axe, made of silver but covered with gold lamina. The decoration showing a winged feline and heads of two eagles would appear to have had some mythological import (Pl. 7). It also seems most likely that this axe was not used for cutting wood or for a similar purpose but may have been ceremonial in nature – perhaps mounted on a specially made staff and held by a person in authority, as a mark of his position.

(v) Sculptural Art

Though we have already dealt with objects of stone and metal and with ceramics, we discuss here separately the art of sculpting in stone, metal and earthenware, since these objects throw valuable light on the artistic acumen of the BMAC people and demonstrate how very individualistic was their art-style.

Here is a stone sculpture of a seated lady from Bactria (Pl. 8). In order to bring out the contrast in the portrayal, the sculptor has chosen a blackish stone for the dress with which the major part of the body is covered but a pinkish white one for the head and hands. Also to be noted are not only the herring-bone weave (decoration on) of the garment, but also the details in depicting the hair-style.

It is not just the human beings that attracted the attention of the BMAC artist, but the animal-world as well. And here are two objects, both from Bactria, one depicting a feline (Pl. 9) and the other a goat (Pl. 10). The gold-leaf and inlay-work in the case of the former is indeed superb and so also is the choice of coloured stones in the case of the goat, namely lapis lazuli for the horns, eyes and beard and limestone for the rest of the body.

Though termed as 'the poor man's medium' of art-expression, the earthen sculptures are no less remarkable. Take for example, the following figurine from Gonur Depe necropolis in Margiana. It has a slender neck, aquiline nose, prominent eyes, arched eyebrows, receding forehead and a very distinctive head-dress (Pl. 11).

(vi) Seals and Amulets

Seals and amulets are a very significant constituent of the Bactria-Margiana Archaeological Complex, since the individual motifs as well as the narrative scenes depicted thereon throw valuable light on the religious beliefs and practices of the people. The seals were made of metals, such as copper/bronze and silver, while the amulets were usually of stone, mostly black steatite. These latter usually show, amongst other motifs, snakes, scorpions, eagles, two-humped (typically Bactrian) camels, felines, etc. The snake seems to be such a favourite that it is depicted on the ceramic 'rituals bowls' as well (already referred to). The metal seals are to be noted, besides other motifs, for geometric ones. But most spectacular are the narratives on the cylindrical seals. We propose to illustrate these later when their narratives will also be discussed.

(vii) The Chronological Horizon

A good deal of controversy surrounds the origin of the Bactria-Margiana Archaeological Complex, namely whether it was a local development from Namazga V or it was born out of an external impetus. Be that as it may, Carbon-14 dates indicate that Period 1 at Gonur depe may have commenced around 2100 BCE and continued up to 1900 BCE, while Period 2, which is what is known as the BMAC proper, may be ascribed to circa 2000-1700 BCE.

An analysis of the various views

In the earlier part of this Address we had stated that we shall examine the viewpoints of Professors Romila Thapar and R. S. Sharma on the one hand and of Professors Asko Parpola and Viktor Sarianidi on the other. Thus, we begin with the views of the first two scholars.

Views of Romila Thapar and R. S. Sharma

Having failed to establish an 'Aryan *Invasion*' of India, Professor Thapar comes out (1989-91:259-60) with a new theory, viz.: "If invasion is discarded then the mechanism of migration and occasional contacts come into sharper focus. The migrations appear to have been of **pastoral cattle-breeders** who are prominent in the *Avesta* and *Rigveda*".

Following faithfully the footsteps of Thapar and amplifying her stand, Professor Sharma avers (1999: 77): "... **the pastoralists who moved to the Indian borderland came from Bactria-Margiana Archaeological Complex** ***or BMAC which saw the genesis of the culture of the Rigveda.***"

Both Thapar and Sharma are even now labouring under the 19th century belief that the Vedic Aryans were nomads. But have they even once cast a glance at the make-up of the Bactria-Margiana Archaeological Complex. As would have been absolutely clear by now, **the BMAC is a fully developed civilization with all the trappings of urbanism. How can then Thapar and Sharma devalue the Bactria-Margiana people and call them 'pastoral cattle-breeders'? Just to fit into their pre-conceived notion that the Rigvedic Aryans were 'nomads'?**

Views of Asko Parpola

In his paper, 'Margiana and the Aryan Problem', Asko Parpola states(1993:47): "These excavations at Mehrgarh, Sibri, Nausharo and Quetta have conclusively shown that immigrants bringing with them an entire new cultural complex have settled in Baluchistan, with close parallels in Gurgan, south Turkmenistan, Margiana and Bactria of the Namazga V-VI period."

Whereas certain parallels between the Quetta-Sibri finds and those from the Bactria-Margiana regions are acceptable, one is really baffled by the succeeding statement of Parpola, namely: "**A newly found antennae-hilted sword from Bactria paralleling those from Fatehgarh suggests that this same wave of immigrants may also have introduced the Gangetic Copper Hoards into India.**" (Fig.5).

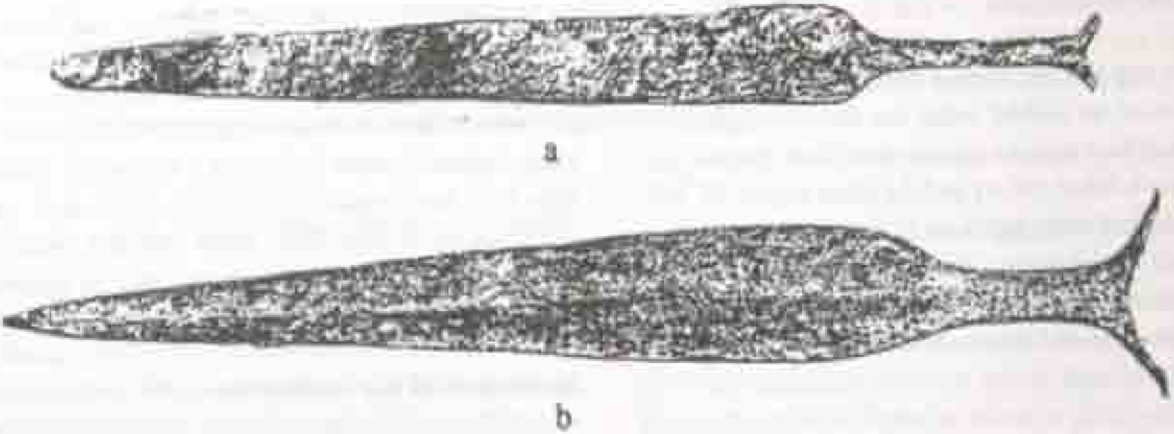


Fig. 5: Antennae-hilted swords of copper

I am sure Parpola is aware of the fact that the Copper Hoards of the Gangetic Valley, as would be seen from the illustration that follows (Fig.6), include many other

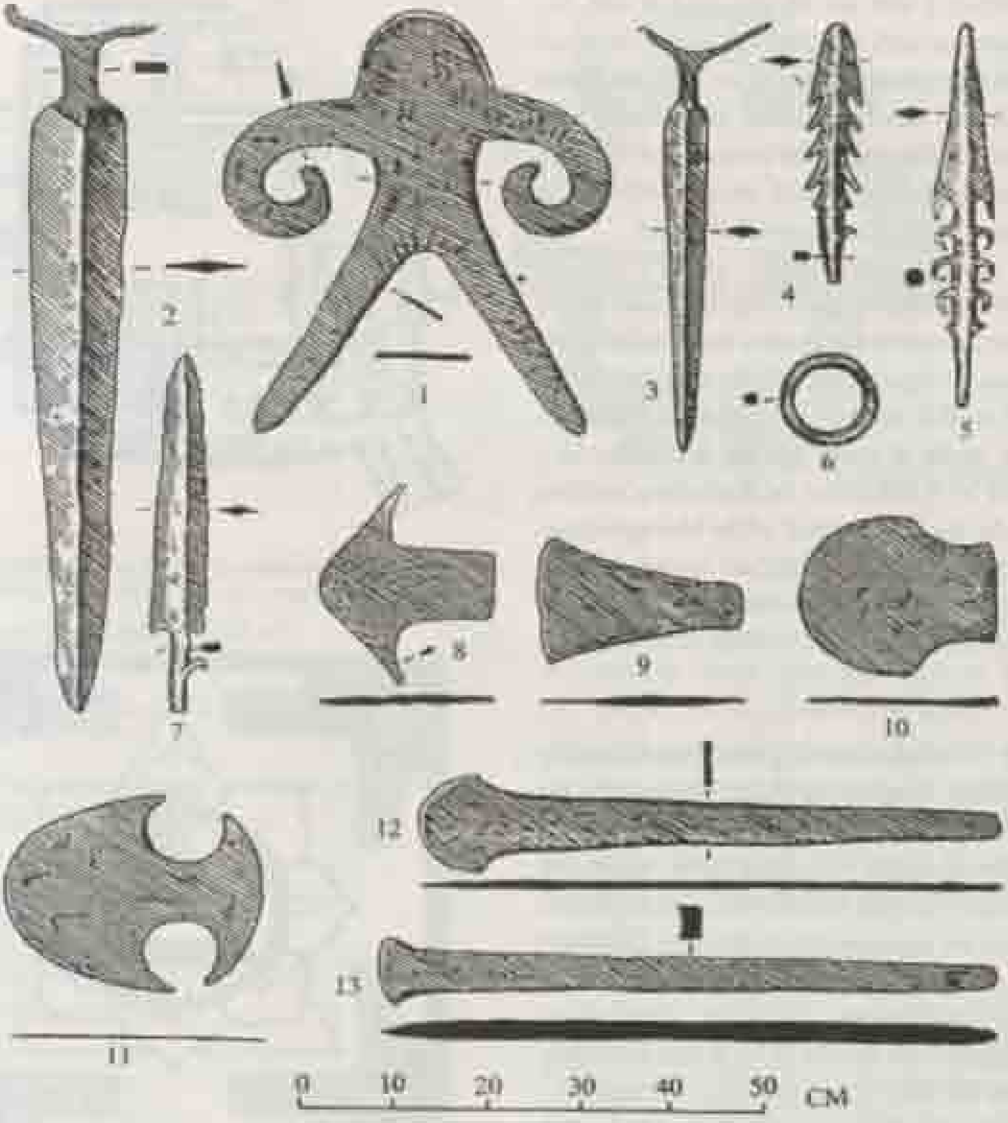


Fig. 6: Copper-hoards from the Gangetic valley, India

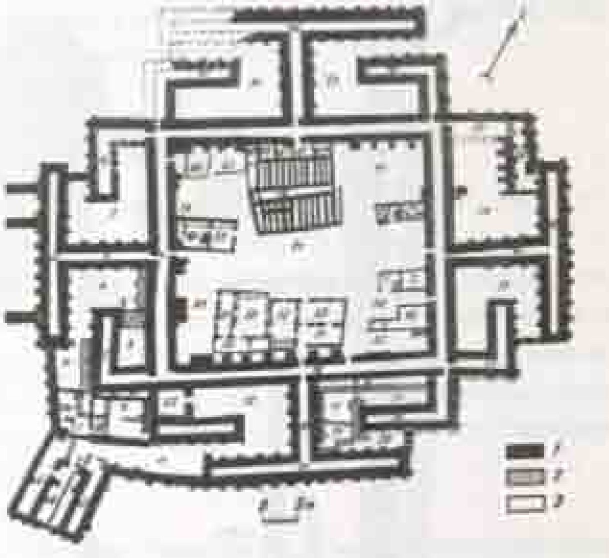
very distinctive types, such as anthropomorphic figures, harpoons, shouldered axes, etc. which have never been found in Bactria.

Further, the overall cultural ethos, including the distinctive pottery, of the Gangetic Copper Hoards is totally different from that of the Bactraia-Margiana Archaeological Complex and that the former cannot be derived from the latter. But more strange is the argument that the occurrence of a **single** antennae-hilted sword in Bactria would entitle that region to be the 'motherland' of the Gangetic Copper Hoard people who produced these copper weapons and other associated objects in hundreds, if not thousands. If this logic is stretched further. I will not be surprised if one day Parpola comes out with the thesis that the Harappan Civilization too originated in Margiana, because in that region (at Gonur) has been found **one** steatite seal bearing typical Harappan inscription and motif (Pl. 12), unmindful of the fact that such seals constitute an unalienable part of the Harappan Civilization.

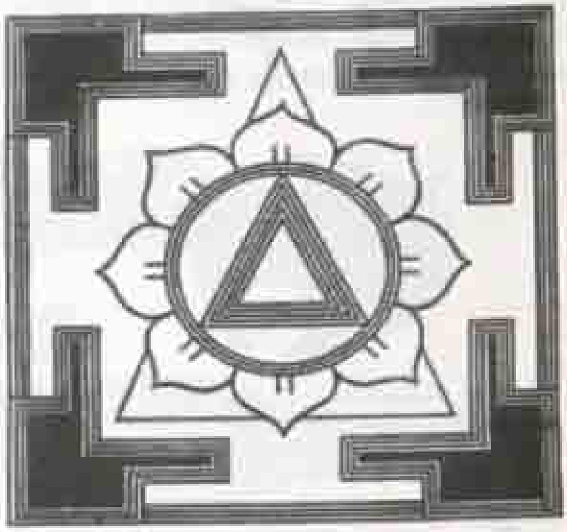
If, following the footsteps of Parpola, I were to say that the find of the well known seal of the 'Persian Gulf' style at Lothal in Gujarat establishes that the Persian Gulf Culture (which abounds in such seals) originated in Gujarat or, again, if I said that the occurrence of a cylinder seal at Kalibangan in Rajasthan entitles Rajasthan to be the 'motherland' of the Mesopotamian Culture (wherein cylinder seals are found in large numbers), I am sure my learned colleagues present here would at once get me admitted to the nearest lunatic asylum.

One finds yet another amusing example of a similar kind of unbridled imagination when Parpola calls the ground-plan of the palace at Dashly-3, datable to circa 2000 BCE, "the prototype of the later Tantric mandalas/ yantras". He then goes on to add: "That the religion of the Dasas [who are mentioned in the *Rigveda* and whom he identifies with the Bactria-Margiana people] was an early form of Saktism is also suggested by the ground plan of the palace of Dashly-3 in Bactria closely agreeing with the later Tantric mandala .."(ibid.:52). For the sake of unambiguity, I reproduce now the drawings of the Dashly-3 Palace and the Mahakali yantra (Fig.7), as published by Parpola himself (ibid. :62), and leave it to the learned scholars to decide whether they too would like to accompany Parpola in crossing this 4000-year-old and 4000-kilometre-long bridge along with Parpola.

Must we really indulge in such a kite-flying just to support our preconceived notions?



Ground-plan of the palace at Dashly-3. About 2000B.C. (after Sarianidi). This is the prototype of the later Tantric *mandalas yantras*.

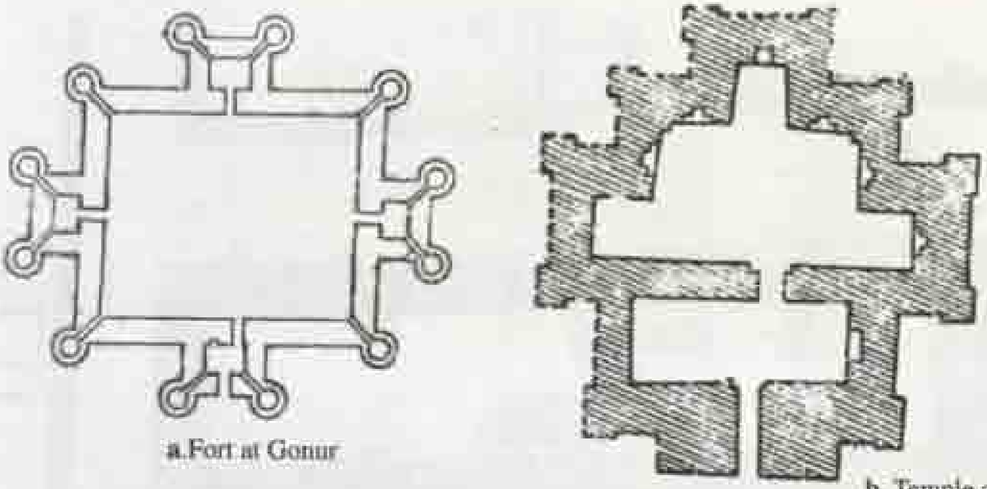


The Mahakali yantra(After Preston)

Fig. 7

Sarianidi's Views

It has been claimed by certain scholars, including Sarianidi, that the BMAC people were the forebears of the Iranians and Indo-Aryans. This conclusion seems to have been drawn primarily on the following four



a.Fort at Gonur

b. Temple at Nush-i-Jan

Fig. 8

counts: viz.

(i) fire-worship temples of BMAC;

(ii) supposed use of *soma/homa* in BMAC rituals;

(iii) mistaken identity of a horse's skeleton as evidence of the *asvamedha;* and

(iv) cult motifs on the BMAC glyptics.

We shall now examine, though briefly, the evidence in respect of these four claims.

(i) Fire Worship

It has been argued that the BMAC temples were devoted to fire-worship and that since this kind of worship constitutes the main religious base of the Zoroastrians, they and the BMAC people shared a common ancestry. This is what Sarianidi says (1993a: 679) in this context: "A building unearthed at Gonur *temenos* and conveniently called a fort has a cross-shaped general plan with twelve corner towers. It most closely resembles the outer contours of the indisputable fire temple at Tepe Nush-i-Jan. A difference of minor importance only consists of the fact that while the towers are round at Gonur, they are square at Tepe Nush-i-Jan" (Fig.8). But he immediately admits the weakness of the comparison by stating: "Unfortunately, the fort (at Gonur *temenos*) **appears to be unfinished so we do not know its inner construction, but *apparently* it too was a fire temple."** What is the great point in forcing such a **comparison when the evidence itself so weak?**

In order to show that the Indian subcontinent was also involved in such a fire-worship, Sarianidi adds (ibid., p. 676): "An example is the fire temple in the lower town of Mohenjo-daro; its basic plan comprises a 'courtyard encompassed by corridors' (Dhavalikar and Atre 1989)" (Fig.9).

In their article, Dhavalikar and Atre have gone into a series of conjectures, there being no down-to-earth evidence for actual fire worship in that complex. On the contrary, Marshall (1931, Vol. I: 202) takes this structure to have been a normal residential house. But in his desperation to bring India as well into the orbit of a Zoarastrian kind of fire worship, Sarianidi has

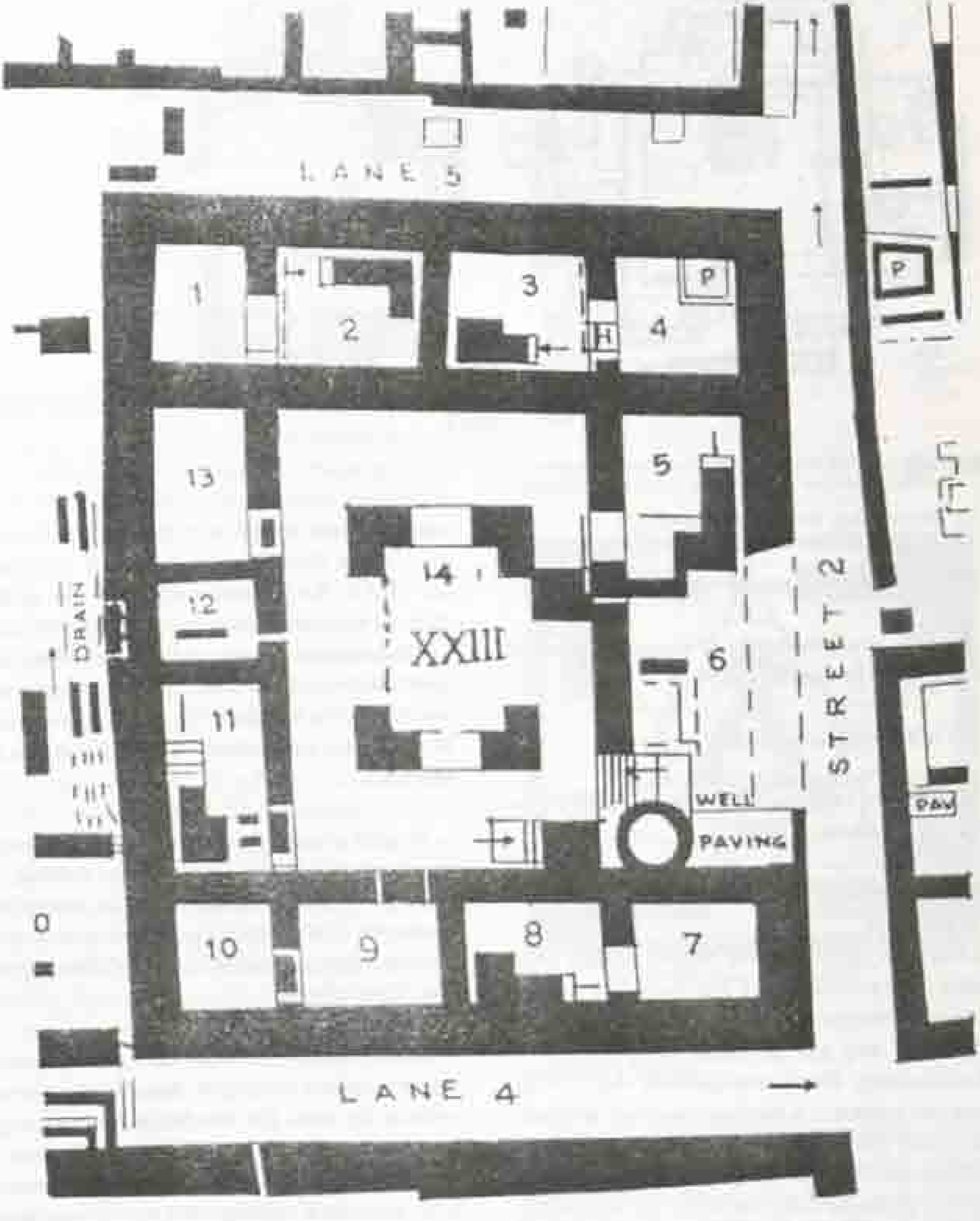


Fig. 9: Mohenjo-daro: " Fire Temple"?

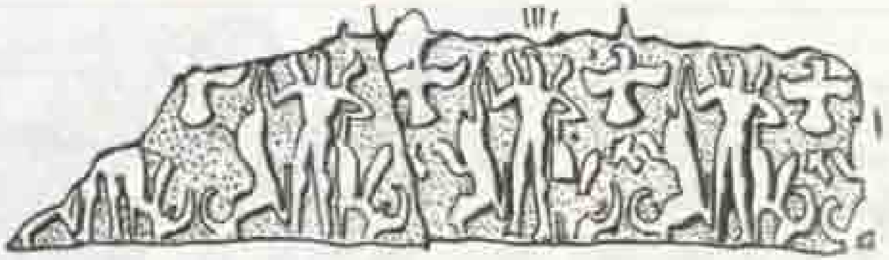


Fig. 10: Impression of cylinder seal from Gonur-1

completely lost sight of the fact that the house-complex at Mohenjo-daro belongs to the Indus Civilization of the 3rd millennium BCE whereas the BMAC is much later, dated to the 2nd millennium BCE. Thus, **if at all the comparison made by Sarianidi is accepted, the direction of movement will have to be from India to Central Asia and not vice-versa!**

(ii) The Soma/Homa

It has been claimed that there occurred the remains of ephedra and poppy in the temple of Togolok-21 in Margiana and since ephedra has been thought to be identical with the *soma/homa* of the *Rigveda/Avesta*, the BMAC people must have been the ancestors of the Indo-Iranians. There are two snags in this thesis. In the first place, not all experts agree that *soma/homa* is nothing but ephedra. But what is more important is that Harri Nyberg, a well known authority on the subject, after a thorough examination of the Togolok evidence, writes (1995:402):

> "... remains of ephedras have also been reported from the temple-fortress complex of Togolok 21 in the Merv oasis (ancient Margiana – Parpola 1988; Meier-Melikyan 1990) along with the remains of poppies. ... In 1990 I received some samples from the site [forwarded by Dr. Fred Hiebert of Harvard University] , which were subjected to pollen analysis at the Department of Botany, University of Helsinki. .... The largest amount of pollen was found in the bone tube (used for imbibing liquid?) from Gonur 1, but even in this sample, which had been prserved in a comparatively sheltered position when compared with the other

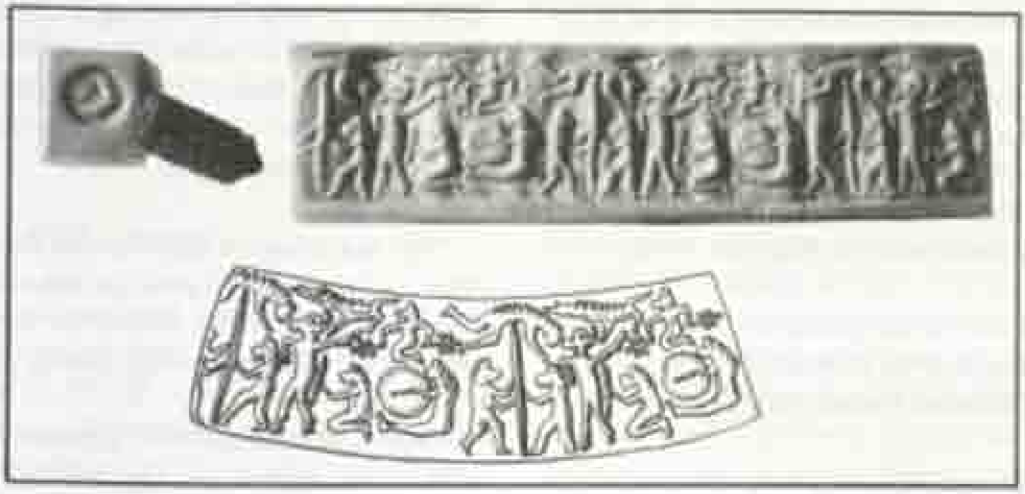


Fig. 11: Cylinder seal from Togolok-21 and its impressions

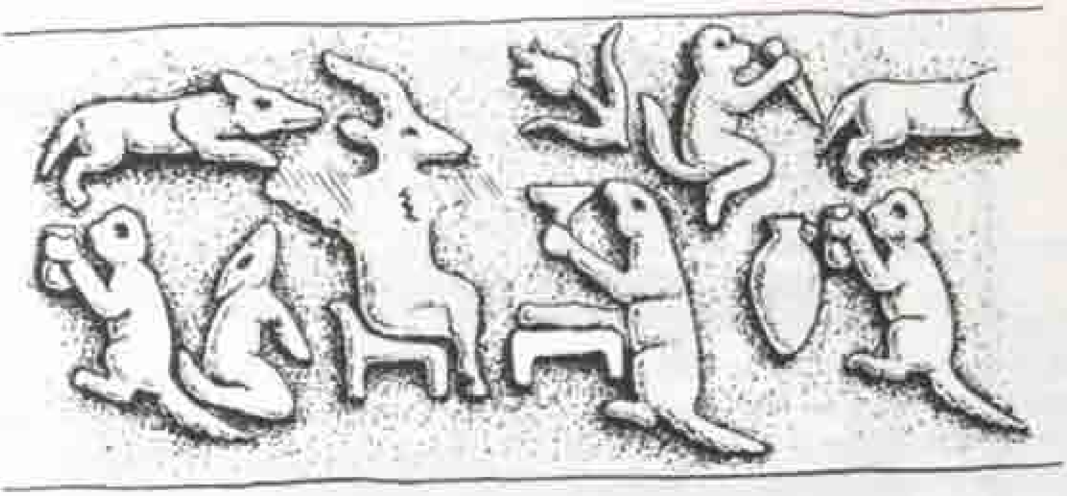


Fig. 12: Scenes on a cosmetic flacon, Bactria

investigated samples, only pollen of the family Caryophyllaceae was present. ***No pollen from ephedras or poppies was found*** and even the pollen left in the samples showed clear traces of deterioration (typical in ancient pollen having been preserved in a dry environment in contact with oxygen). **Our pollen analysis was carefully checked for any methodological errors, but no inaccuracies were found.**

(iii) The Asvamedha

The discovery, in the cemetery area at Gonur, of the skeleton of a horse, with its head missing, has led Sarianidi to postulate that it is a case of the *As-vamedha* (horse-sacrifice); and since the *Asvamedha* is a ritual mentioned in the *Rigveda*, he argues that the authors of the Bactria-Margiana-Archaeological-Complex must have been the ancestors of the R.igvedic Aryans.

Before we examine the validity of such a conclusion, let us have a look at the photograph of the skeleton, published by Sarianidi himself (Pl.13).

It would be seen from the photograph that there is no clear outline of a pit in which the horse is supposed to have been regularly buried. Further, the skeleton lies hardly a few centimeters below the ground-level. Thus, there could have been many other reasons for the head to be missing, such as erosion through natural agencies or subsequent human interference.

And no less important is the fact that the skeletal remains do not conform to the manner in which the horse had to be sacrificed in the *Asvamedha*.

There are two *Suktas* in the *Rigveda, viz.* 1.162 and 1.163, which are devoted to the *Asvamedha* and lay down how the horse, tied with ropes and accompanied by a goat, had to be taken to the sacrificial altar and then, after some rituals, had to be sacrificed. I quote below two of the verses, viz. 1.162.18 and 1.162.19, which are very relevant here.

"The axe penetrates the thirty-four ribs of the swift horse, the beloved of the gods, (the immolators), cut up (the horse) with skill, so that the limbs may be unperforated and recapitulating joint by joint. (18)

There is one immolator of the radiant horse, which is Time: that are two that hold him fast: such of thy limbs as I cut up in due season, I offer them, made into

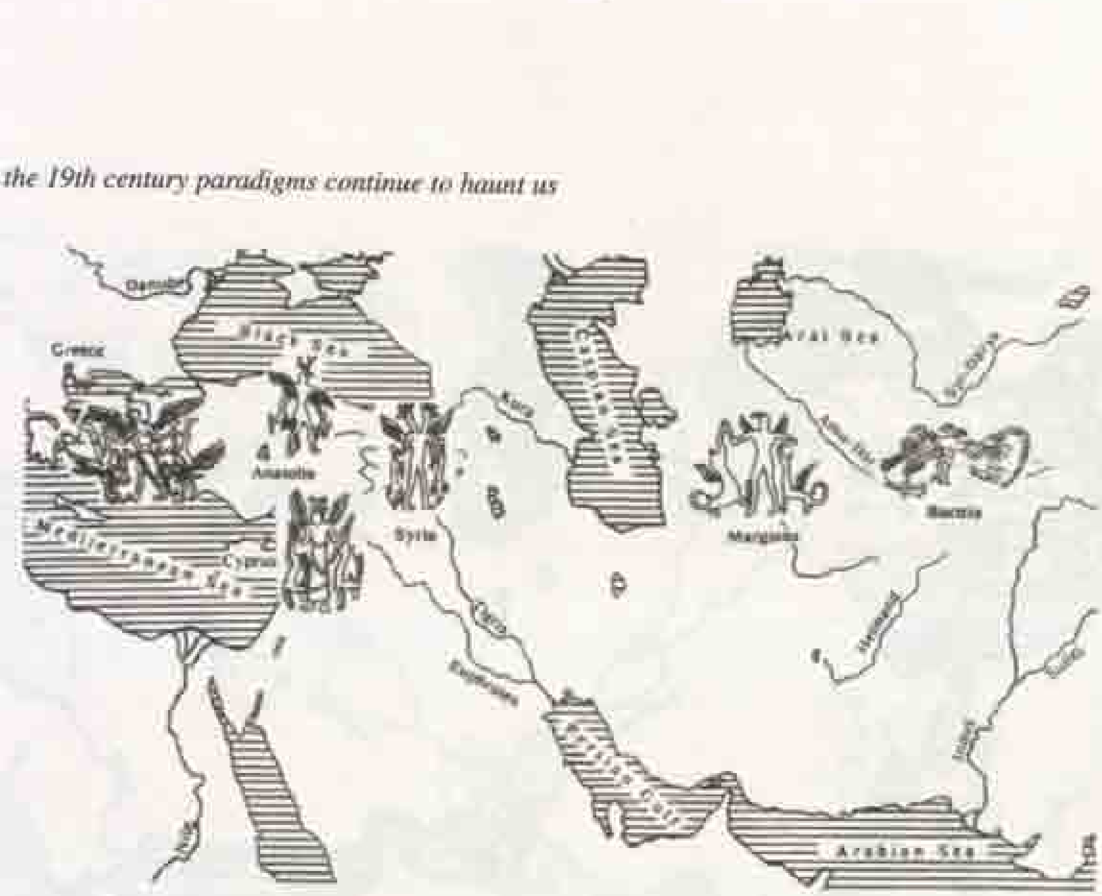


Fig. 13: Spread of the motif of man-bird with hit animals

balls (of meat), upon the fire. (19)

The foregoing description makes it abundantly clear that in the case of the *Asvamedha* the horse had to be *cut up into parts, 'recapitulating joint by joint'*. There is hardly any evidence of such a cutting up in the case of the horse's skeleton discovered at Gonur. Then why be so imaginative as to call this skeleton as evidence of the *Asvamedha* and thereby draw an uncalled for conclusion that the BMAC people were the ancestors of the Rigvedic Aryans ?

(iv) Motifs on BMAC glyptics

The fourth argument that has been pressed into the service of the supposed BMAC=Aryan equation is that the motifs on the BMAC seals compare with certain motifs on the Syro-Hittite glyptics and since there occur on some Boghaz Qui tablets the names of Vedic deities, viz. Indra, Mitra, Varuna and Na-satya, the Boghaz Qui Aryans must be at the root of BMAC ethnic make-up. To quote Sarianidi (*op.cit.*:677): "Since it is Mitanni texts that contain the oldest mention of Aryan deities, there cannot be any doubt about the connection of the Mitanni empire with the so-called Aryan problem. As the replication of Mitanni art in Bactria and Margiana is clearly not coincidental, we are justified in connecting the tribes migrating into Central Asia and the Indus Valley with the settlement process of the Aryan or Indo-Iranian tribes."

Elsewhere Sarianidi goes into the details of these Syro-Hittite vis-à-vis Bactria-Margiana glyptic parallels. For example, he states (1993b:12-13):

In this connection worthy of utmost attention is the impression of a cylinder seal on one of the Margianian vessels, found... at Gonur. The central figure of a frequently repeated frieze composition is a standing nude anthropomorphic winged deity with an avian head

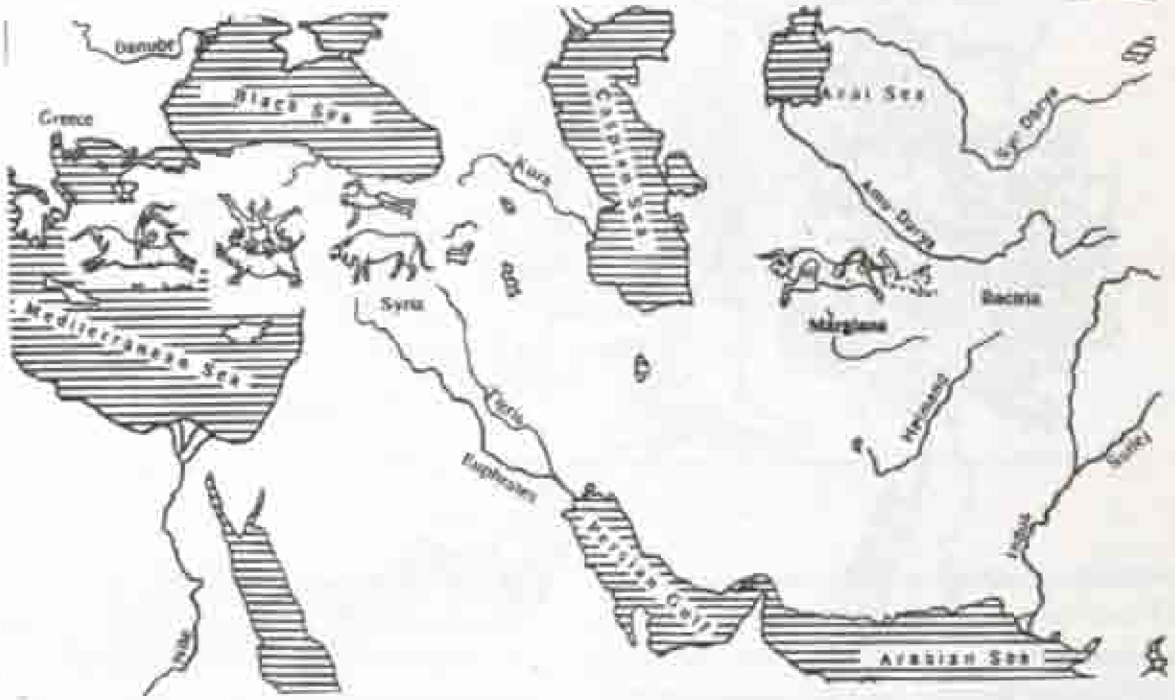


Fig. 14: Spread of the motif of acrobats jumping over bulls

holding two mountain goats by the legs...

Such anthropomorphic winged and avian-headed deities are represented fairly fully in the glyptics and on the seals of Bactria ... These Bactrian images find the most impressive correspondence in Syro-Hittite glyptics.

If the fact that it's for the Mittani kingdom that the names of Aryan deities are evidenced is taken into account the importance of the Bactrian-Margianian images will become obvious in the light of solving the Aryan problem on the basis of new archaeological data.

While one has little hesitation in accepting the above-noted Syro-Hittite vis-a-vis Bactia-Margiana parallels, what indeed is the basis of connecting these motifs with the Aryan gods, viz. Indra, Mitra, Varuna and Nasatya? (cf. Fig.10).

Does Sarianidi think that the 'standing nude anthropomorphic winged deity with an avian head holding two mountain goats by the legs..' represents one of the above-mentioned Vedic gods – Indra, Mitra, Varun.a, Na-satya?

Likewise, what precisely Aryan is there in the following narrative portrayed on another cylinder seal? (Fig.11).

Perhaps one fine morning someone might be tempted to designate the scene depicted on the next seal as "The offering of *Soma* to Indra", where Indra is the central figure seated on a chair and his devotees are offering the *soma* in cups, the beverage itself being stored in the jar!! (Fig.12).

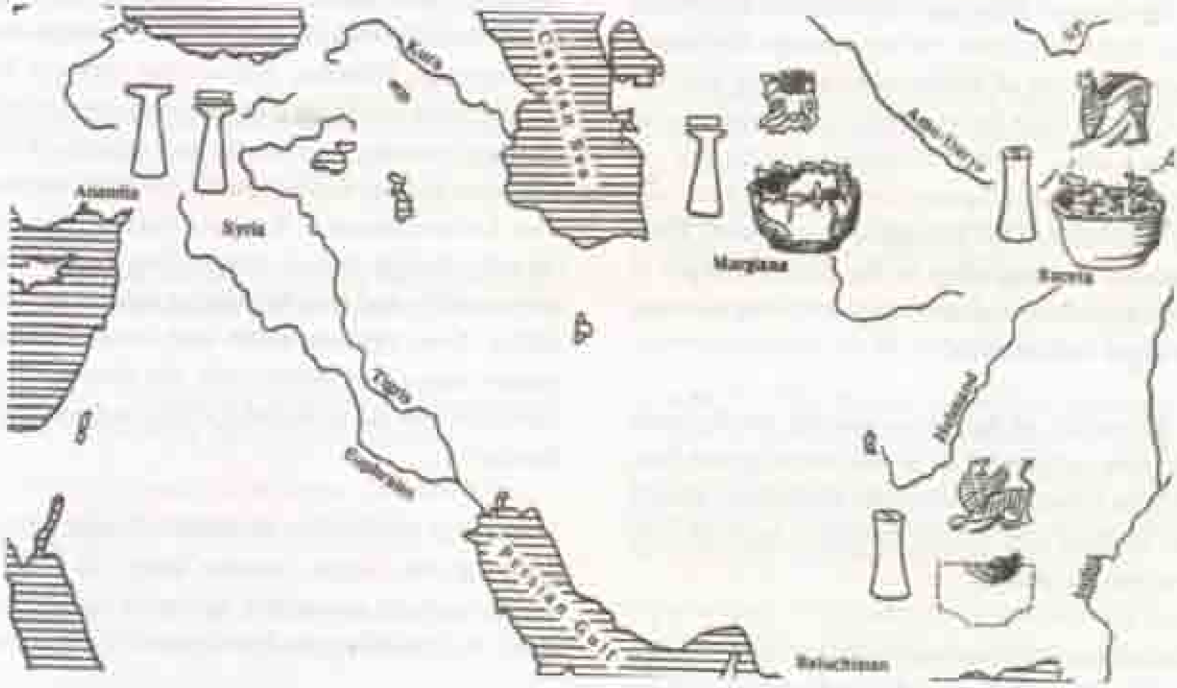


Fig. 15: Spread of the 'miniatures columns' and their probable prototypes in the Sypro-Hittite world

Finally, the most crucial aspect of the issue.

The following three maps (Figs. 13, 14 & 15), not drawn by me but **published by Sarianidi himself** (1993b: Figs. 2, 3 and 5) relate to the spatial distribution respectively of 'the motif of man-bird with hit animals', 'the motif of acrobats jumping over bulls', and 'miniature columns and cult vessels with depiction of snakes and animals on the rim'.

A careful look at these maps would make it abundantly clear that the glyptic motifs shown on the first two maps occur from the Bactria-Margiana region on the east to the Syro-Hittite region on the west but do not travel southwards in the direction of Afghanistan or Baluchistan. It is only the miniature columns and bowls bearing on their rim animal-and-snake motifs that find their way into Baluchistan. ***But in no case did any of the above-noted motifs, columns or snake-decorated bowls find their way east of the Indus up to the upper reaches of the Ganga - Yamuna doab which, as spelt out in the Nadistuti Sukta of the Rigveda itself (10.75.5-6), was the region occupied by the Rigvedic Aryans.***

The only exceptions to the foregoing distribution-pattern are some seals/seal-impressions from Chanhu-daro and Gilund (Possehl 2004: figs. 7 and 15). Sometimes, a double-spiral-headed copper pin from Chanhu-daro (Mackay 1976, reprint, p. 195, pl. LXVIII, 9) and a two-animal-headed antimony stopper-rod, also of copper, from Harappa (Vats 1974, reprint, p. 390, pl. CXXV, 36) are also brought into the discussion. But let it be remembered that all these are only peripheral to the most characteristic and core-items of the Bactria-Margiana Archaeological Complex. Anyway, it would be simply ridiculous to ascribe these few objects to a migration of the BMAC people (cf. Gupta 2006, under print). Have we not in the past explained the occurrence of some items of a given culture-complex in another complex by means of trade/exchange/casual gift or a similar mechanism; for example, the occurrence of Harappan seals, etched carnelian beads, etc. in Mesopotamia, Iran and even Central Asia by trade and **not by migration of the Harappan population? Then why invoke the migration of the BMAC people to explain the presence of some seals/seal-impressions, etc. at stray Indian sites?**

In the context of the debate whether the Rigvedic people were indigenous or invaders/immigrants from outside, the evidence of two sister disciplines, namely human biology and human genetics, must also be brought into the picture.

After a thorough examination of the relevant human skeletons, Hemphill and his colleagues (1991) categorically pronounced: "As for the question of biological continuity within the Indus Valley, two discontinuities appear to exist. The first occurs between 6000 and 4500 BC... and the second occurs at some point after 800 BC." **In other words, there was no entry of a new set of people between 4500 and 800 BCE, much less of Aryan invaders/immigrants!**

In recent years a great deal of genetic research has been carried out which too throws valuable light on this issue; and I quote here Sanghamitra Sahoo et al. (2006: 843-48): "The sharing of some Y-chromosomal haplogroups between Indian and Central Asian populations is most parsimoniously explained by a deep, common ancestry between the two regions, with the diffusion of some Indian-specific lineages northward. **The Y-chromosomal data consistently suggest a largely South Asian origin for Indian caste communities and therefore argue against any major influx, from regions north and west of India, of people associated either with the development of agriculture or the spread of the Indo-Aryan language family."**

Scholars have already abandoned (though after much dithering) the 'Aryan *Invasion*' theory. Is it not high time to re-think and shelve the newly hugged-to-the-chest 'Bactria-Margiana Immigration' thesis as well?

At the end, It needs to be emphasized that the purpose of this Address was not to criticize Professor X or Professor Y. Far from it. The whole emphasis has been on demonstrating how the 19th century paradigms are still dominating our thinking, thereby producing a very blurred vision of South Asia's past. **Can't we begin thinking afresh in this 21st century?**

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The Joint Italian-Mongol Geoarchaeological Project in the Valley of Lakes Gobi Altayn Region

(Bayankhongor aimag, Bogd soumon)

B. Marcolongo[*] and B. Gunchinsuren[**]

A first exploratory mission, done in September 2000 with the financial support of the Italian Ministry of Foreign Affairs (MAE) in the frame of the "Cultural Protocol" between Italia and Mongolia, leads to the signature of a "Memorandum of Understanding" for scientific cooperation by National Research Council of Italy (CNR) and Academy of Sciences of Mongolia (MAS).

Following to that, in April 2002 an international symposium on the cultural relations between Italia-Mongolia had been organized by CNR at the Research Area in Padova, with the participation of Prof B. Chadraa, President of MAS, and Prof. D. Tseveendorj, Director of MAS Archaeological Institute. In this occasion bases have been placed for a joint geo-archaeological project in the Valley of Lakes in the Gobi Altayn region, a strategic cross-road region of nomadic and cultural migrations particularly rich in natural resources and archaeological evidences.

Then, thanks to the financial contributions of MAE/Dept. of Cultural Cooperation and Veneto Region/Dept. of International Relations , annual geo-archaeological expeditions to the field have been realized starting from 2002 and regularly conducted till present, to evaluate resources consistence. Understanding the tight relationships man-environment through time helps very much to develop a correct action of protection either for nature or for cultural heritage. In this picture, ethnographic studies are also inserted, particularly the analysis of nomadic popular traditions focussed to preserve cultures and economies deeply integrated in the delicate equilibrium of the investigated area.

These geo-archaeological missions in the Valley of Lakes (Gobi Altayn region, Bayankhongor aimag), done by a joint Italian-Mongolian team consisting of Prof. Bruno Marcolongo, Dr. Giovanna Fuggetta, Prof. Gabriele Rossi-Osmida, Dr. Günchinsüren Byambaa, Mr. Bolorbat Tsedendorj, Mr.Bazargür Dashzeveg, Mr.Chinzorig Batnasan, intend to realize the first step of an organic project of recovery of the cultural and natural heritage of an area lying between northern

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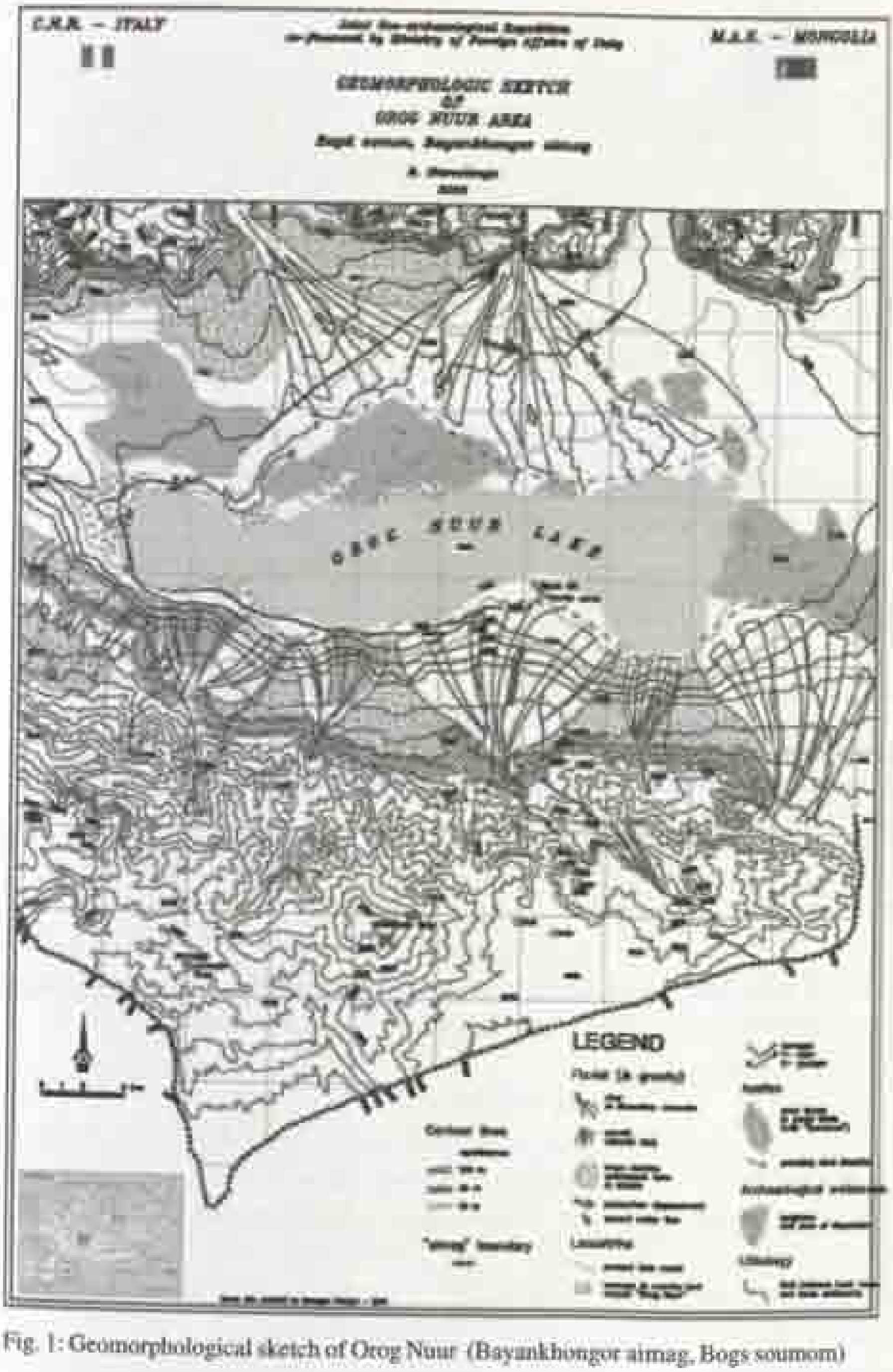


Fig. 1: Geomorphological sketch of Orog Nuur (Bayankhongor aimag, Bogs soumom)

Khangay plateau and the southern Gobi Altayn chain. Since ever, this stretch of land plays the role of commercial and cultural corridor connecting Mongolia to Central Asia, Caspian and Mediterranean basins.

At present, after five expeditions so far done during summer 2002-03-04-05-06 and with a sixth one under accomplishment (July-August 2007), it is possible to recognize the tight relations between settlement patterns of environmental resources in the past and today.

The field survey has been prepared and oriented by preliminary bibliographic researches and collection of topographic and thematic maps. Moreover, various satellite data (Landsat 7ETM multispectral and ERS-SAR radar images) have been analysed to describe the main geomorphological features of the area. This propaedeutical work contributed to reduce time and costs of the exploration phase, mainly performed in a very broad physiographic context with scarce roads network.

Many groups of "khurgan" and other tomb structures, locally called "khirigsuur", belonging to Bronze and Iron age, have been localized at the foot of the Gobi Altayn range. Similarly, numerous sites with petroglyphs depicting zoomorphic, anthropomorphic and symbolic features have been found and recorded. Morphological observations, pollen analysis, radiocarbon dating and ethnographic interviews have been also made.

At the end of this first six-year period of the joint CNR-MAS geoarchaeological project, clearly emerges the richness of the selected test area in terms of cultural and natural resources and then the opportunity to go deeper into the exploration for accomplishing a coherent and complete study. Different scientific competences must converge through a strong cultural exchange for the achievement of all the items of this project, mainly based on the application of advanced technologies for the reconstruction of the environmental evolution.

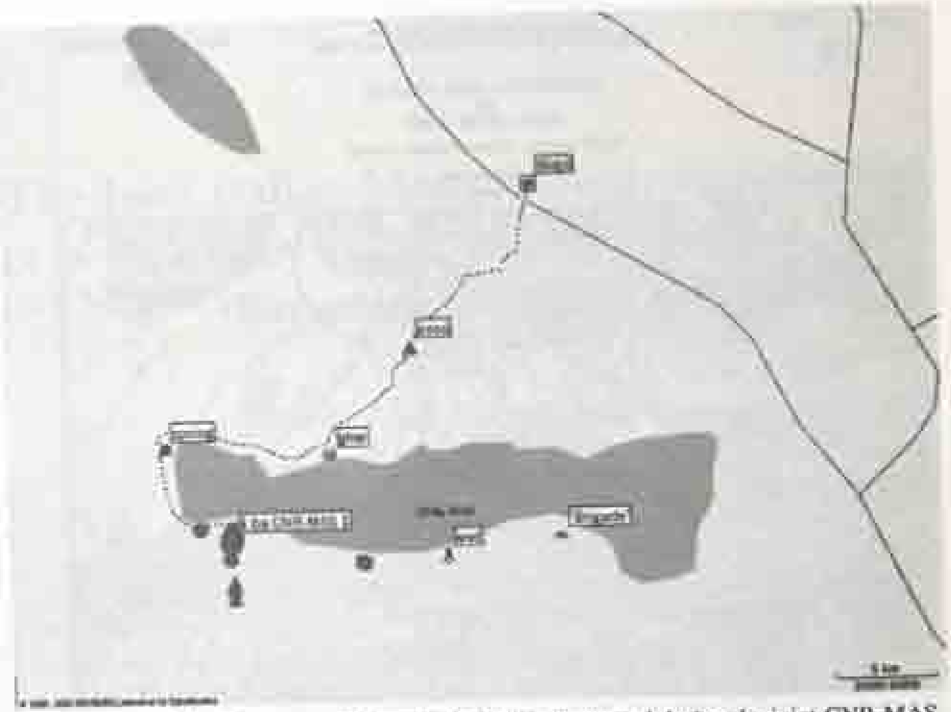


Fig. 2: Necropolis ("Bronze age" khurgan-kereksur) discovered during the joint CNR-MAS expedition on August 2002 at the south-western edge of Orog Nuur lake with "CNR-MAS 1" tomb excavated in 2003.The whole complex has been carefully surveyed with GPS during August 2004 and 2005.

Excavation works

The main necropolis has been discovered at the south-western edge of Orog Lake (Orog Nuur) on August 2002 and the so-called "CNR-MAS 1"tomb has been excavated in 2003. Then the whole complex of "khurgan" has been carefully surveyed with GPS during August 2004, 2005 and 2006.

A total of 251 stone structures including khirigsuur and tombs located on the western bank can be attributed to different ages. We can classify them according to their morphology, such as whether or not they have outer fence, what form (circular, rectangular, etc.) those outer fences have, and so on. The khirigsuurs are dating back to Bronze Age and most tombs are also dating back to Bronze Age, Hsiung-nu period and Turkic period. They consist of 84 khirigsuurs with rectangular outer fence, 20 khirigsuurs with circular outer fence, 70 khirigsuurs without any outer fence, 23 slab graves, 52 circle-shaped tombs, and 2 tombs unclear or very disturbed.

Radiocarbon dating has been performed on human skeleton bones taken from three graves, showing ages of the second half of the II millennium BC.

Tomb OR-85:

- slab grave enclosed by large slab stones. There is one large standing stone at its each corner. Inside the slab enclosure there are two overlapped big stones (size is 3.3×2.2m)
- N 45° 02' 22.5" E 100° 34' 31.2" elevation 1245m
- calibrated age:1220-900 BC

Tomb OR-92:

- slab grave covered by small stones (size is 4.3×4.1m)
- N 45° 02' 19.8" E 100° 34' 32.6" elevation 1248m
- calibrated age:1320-1040 BC

Tomb OR-144:

- khirigsuur encircled by ring outer fence, with central mound covered by large stones (mound is 5.6 m in diameter, 'fence is 14.7 m in diameter)
- N 45° 02' 33.3" E 100° 34' 48.2" elevation 1231m
- calibrated age:1420-1110 BC

Also pollen analysis has been done on Lake Orog sediments, sampled up to a depth of 2 m during summer 2005 in the occasion of a total drying up of the water body itself. The uppermost level (0-20cm) shows the significant pollen grains of the families Tamaricaceae, Poaceae, Cyperaceae, Chenopodiaceae/ Amaranthaceae, Euphorbiaceae, Myrtaceae indicating vegetation of grassland. The upper level (20-80 cm) shows the dominance of pollen grains belonging to the families of Verbenaceae, Anacardiaceae, Combretaceae indicates the typical members of dry deciduous plants. The most dominant plants at the middle level (80-130cm) belong to the families like Myrtaceae, Fabaceae, Anacardiaceae, Euphorbiaceae, Bignoniaceae and Magnoliaceae indicating wet evergreen climate.

In appendix is inserted a synthesis of the significant contribution on this theme brought by Dr. Vishwas Gogte from Deccan College of Pune.

Structures excavated in the year of 2005

Zeregleen Bel Tomb No.01. Yellowish folded hills, located at the northeast slope of Mts. Ikh Bogd Uul, is called as *Zeregleen Bel* by native people. North of the hills, there is a dried water channel or deep broad ravine. Two tombs are situated on the east bank of that ravine. The distance are 100 m between them. We named the west one as *Zeregleen Bel No.1* (N 45° 03' 47.0", E 100° 27' 35.2") to choose for excavation because of its clear construction. The tomb was encircled by a ring of stones whose western edge is accumulated considerably by small pebbles and deposits due to the flow of natural water. The horizontal profile is 7.5 m in length. The cleaning of the shallow sandy layer of Level 1 shows that the circular edge of ring was piled by relativley big stones as an enclosure; Small and moderate sized stones were exposed in the center of the edge of the tomb. The actual size is probably 6.9 m in diameter. Overlapping with stone edge, four oval-shaped big stones were installed into the soil respectivley at its four corners,

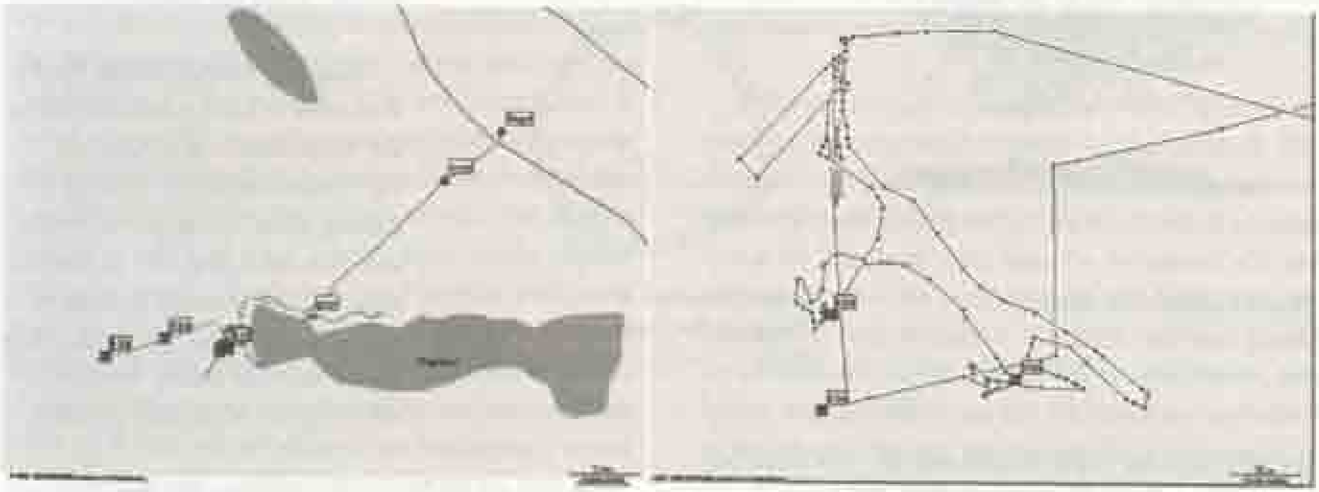
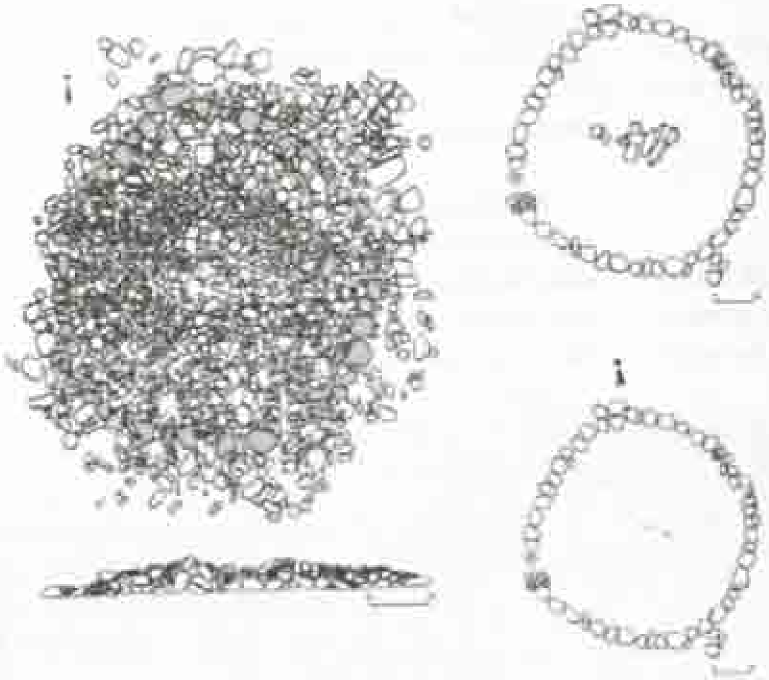


Fig. 3: Tombs ("Xiongnu" k xi and "Bronze age" k ba) discovered during the CNR-MAS expedition 2004 west of Orog Nuur and excavated during summer 2005



Plan of Zeregleen Bel Tomb No. 01

General Structure of Zeregleen Bel Tomb No.01

Fig. 4

but all except the southwestern one are very disturbed. The width of cover stones assembled in the center is on average 6 m in the middle and 3 m on edges. The removal of those cover stones of Layer 2 shows that the remains of burial pit was uncovered beneath the layer of few oval-shaped large flat stones. The pit was 2.2×1.1 m. Some bones of human hand and rodent bones are revealed much around these large cover stones. Upon reaching a depth of 15 cm below the Layer 2, we encountered fragments of top part of human skull, femur and shin bones indicating that the dead body was placed to the northwest. No more artifacts could be found. After continuing the excavation to the natural sediments, we stopped to reconstruct.

Zeregleen Bel Tomb No.02. The tomb called *Zeregleen Bel No.2* (N 45° 03' 48.3", E 100° 27' 36.5", elevation 1385 m) is situated 100 m of Zeregleen Bel No.1. The tomb with depression in the center is encircled by double rings of stones, small and large. It is 6.8 m in diameter. After the removal of cover stones, it shows no remains of funeral ritual. We continued to excavate the pit 1.5×2 m in size labelled as Layer 2 in the center. But we encountered the natural sediment at the depth of 30 cm below the Layer 2. Documentating the arrangement we reconstructed the tomb.

Tsagaan Övdög Tomb No.01. A number of khirigsuurs and tombs are located east of a high hill 3.5 km northwest of Zeregleen Bel. Among them, a slab grave running in a east-west direction is situated adjacent to the corral in front of a winter camp. We called this slab burial *Tsagaan Övdög Tomb No.01* (N 45° 03' 03.4", E 100° 24' 08.5").

It is enclosed on its edge by large-sized flat smooth stones. Four standing stones are one by one at its four corners. On the east side outside of the enclosure, some large flat stones are laid side by side on the ground measuring as 2.5×5.4 m. The slab burial is 3.8×5 m and, if counting the exterior structure it is 7.5×5.4 m.

During the cleaning there found a Neolithic circular end-scraper made of a kind of jade in the center of the burial. The Layer 1 shows that the pit was covered by big stones. We labelled the removal of those cover stones as Layer 2. In the process of excavating Layer 2 we uncovered a hearth and fragments of burnt animal bones on the east side, and large and small coarse fragments of reddish pottery such as rim on the south side. In addition we encountered three large round-shaped flat cover stones. The first one on the head part is 1×0.8×0.36 m in length, breadth and thickness, the second one in the middle 1.2×0.9×0.34 m, and the third one standing by side on the feet part 1.36×0.97×0.35 m. The surfaces of their one parts are convex; the surfaces of other parts are concave. We found one more end-scraper on the first cover stone, but below the place where the first end-scraper is found there is second cover stone. Therefore, we conclude that these two end-scrapers were placed at first on the first and second cover stones. After the removal of these flat cover stones, we revealed some pottery fragments similar to the above mentioned ones below the second cover stone. But we did not encounter anymore artifact and finished the excavation after reaching natural rocks in the 1.4×0.55 m pit at the depth of 56 cm below Layer 2. Finally, we tested along the enclosure of stones outside. There found three pottery fragments similar to the earlier ones and a Neolithic conical blade core. We assume that these artifacts were thrown away to the outside during the loot. It is very possible that when the looters they moved a big enclosing stone on the feet part away and through it entered into the slab burial from the south. A total of three stone tools including one conical blade core and two round-shaped end-scrapers, seven fragments of gray pottery rim and other six fragments of its body, and one fragment of a well-fired dark gray pottery.

Brief definition of all artifacts is the following:

1. Conical core (1). Some flakes are removed from the striking platform to adjust the angle of detachment. The core is made of dark-gray flint stone. The size is 12×18×38 mm.

2. Round-shaped end-scraper (2). An end-scraper 15×16×3 mm in size is made on the end of a dark-gray flint flake. The flake is by percussion shaped in retouched concave and circular tool. Another scraper 16×19×6 mm in size is retouched on the flake of bright red flint.

3. Rim fragment of pottery (7). We found seven fragments of grey pottery. After the preliminary analysis, we assume that they are of a cauldron. The body is probably patterned in the application of incising and pressing on the surface. There is a line of beautiful raised pattern around the exterior surface 58 m below the rim. It can be used for both decoration and handle. The diameter of the rim is 230 mm.

Tsagaan Övdög Tomb No.02. This tomb (N 45° 03' 03.1", E 100° 24' 06.7", elevation 1621 m) is located very close to or west of the Tsagaan Övdög Tomb No.01.

It is a small circle-shaped tomb covered by medium-sized stones scattered slightly on the ground. The diameter is 2.6 m. After the removal of cover stones scattered on the ground surface we encountered a human burial pit. The dead body lying on the natural soil had been placed to the southwest by his head, but its structure is very disturbed. The head had been placed by its right side to the south. Femurs, shin bones, arm bones, scapula bones, and few rib bones are assembled in the place of breast. We continued the excavation to the natural sediments, but no other artifact is found.

Tsagaan Övdög Tomb No.03. This tomb (N 45° 03' 03.2", E 100° 24' 06.7", elevation 1621 m) is located 3 m northeast of the Tsagaan Övdög Tomb No.02.

It is a circular tomb covered by medium-sized stones. The diameter is 1.8 m. After taking the cover stones off, we did encounter any trace of funeral ritual to the natural soils below the surface. We stopped the excavation.

Tsagaan Övdög Tomb No.04. This tomb (N 45° 03' 03.2", E 100° 24' 07.2", elevation 1620 m) is located 5 m east of the Tsagaan Övdög Tomb No.03.

It is a circular tomb covered by medium-sized stones. The diameter is 3.6 m. After taking the cover stones off, we did encounter any trace of funeral ritual to the natural soils below the surface. We stopped the excavation.

Tsagaan Övdög Tomb No.05. This tomb (N 45° 03' 02.3", E 100° 24' 10.2", elevation 1611 m) is located 100 m southeast of the Tsagaan Övdög Tomb No.01 and 10 m west of a moderate khirigsuur without outer fence.

It is a circular tomb covered by medium-sized stones, but enclosed by a ring of large stones on edge. The diameter is 4.1 m on the surface. After the first cleaning, the real size is revealed as 3.5 m in diameter. After cleaning all the cover stones to the depth of 15 cm below the surface, we did not dig further because of no trace of funeral ritual.

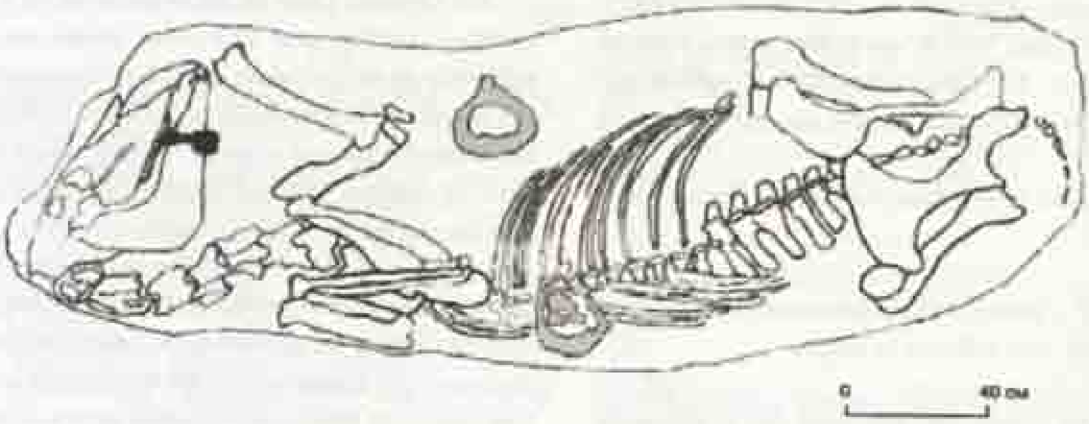
Tsagaan Övdög Tomb No.06. This tomb (N 45° 03' 05.2", E 100° 24' 15.3", elevation 1598 m) is located 20 m northeast of the Tsagaan Övdög Tomb No.01.

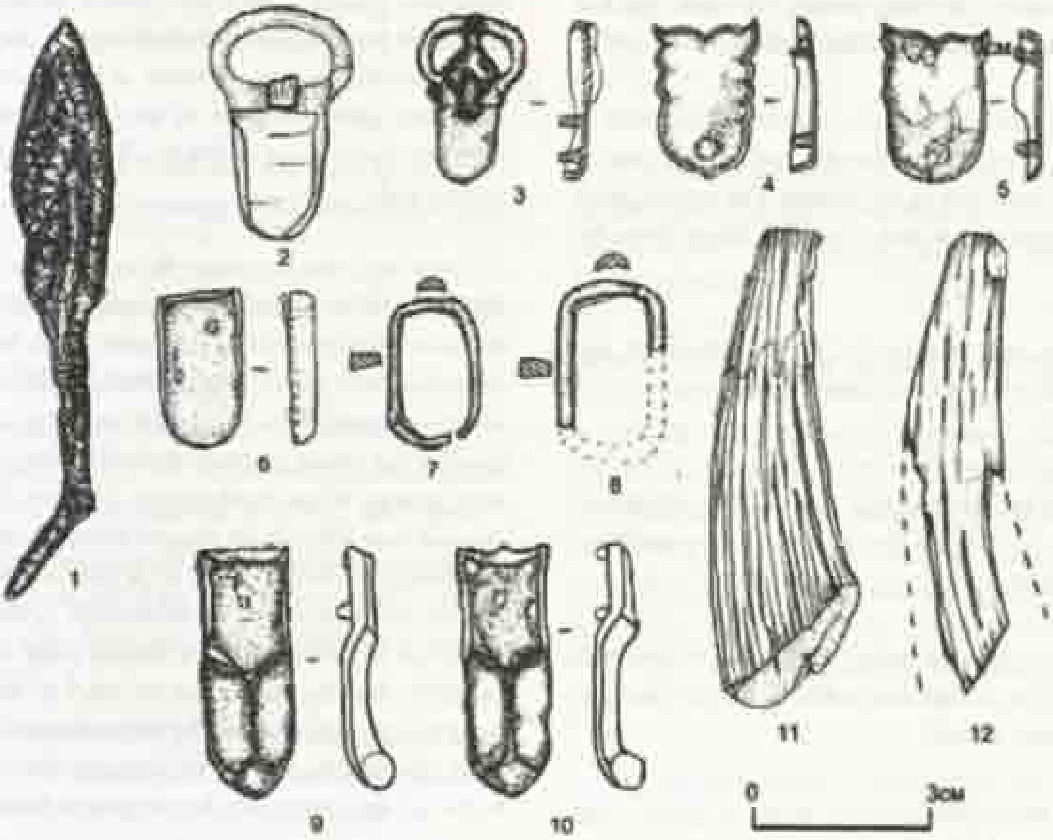
It is a circular tomb covered by large stones. The diameter is 4.2 m. After the first cleaning, the real size is revealed as 3.5 m in diameter. After cleaning all the cover stones, we did not dig further because of no trace of burial pit. But we found a flat fragment of human skull on the surface.

Tarimalt Tomb No.01. This tomb (N 45° 03' 32.9", E 100° 26' 38.7", elevation 1431 m) is in northwest. One of two tombs located near a old broken artificial pool 800 m west of Zeregleen Bel Tomb No.01.

Tarimalt Tomb No.01 is encircled by a ring of few stones. It is 6.6 m in diameter. After the first cleaning, we did not encounter any evidence of burial postpit at a depth of 30 cm below the ground surface, but continued to make the pit smaller to the depth of 10 cm further in the center where we could find a cap of stone box consisted of few flat stones piled in a row. We labelled the further excavation as Layer 2. At a depth of 1.2 m in that pit 2.6×1.4 m in size we uncovered some animal bone fragments. Then we decided to extend the pit size into 3.3×2.7 m where we revealed a very broken bone of human chin at a depth of 1.4 m and then encountered darker sediment of burial postpit at a depth of 1.62 m below the surface, which on its northern side some fragments of wood and in the middle bones of human skull and femurs, and below the bone fragments of the skull top fragments of scapula bones were exposed. At Layer 2, a quantity of bone fragments were found everywhere in the pit with other rodent bones and postpit of their holes indicating that its configuration is also deformed or destroyed considerably both by the natural condition and by the looting process.

As we excavated removing of the above mentioned bones further to a depth of 1.7 m below the surface, we could see that the ancient had placed the dead body in a box of wooden box, where in the middle one large fragment of ear of a bow, one wooden toggle, and one small toggle were revealed. The box is very broken. When cleaning the interior surface, we found a circle-shaped ornament, a bronze belt buckle and a metal arrowhead on the western side of the lower feet part or on the floor. The metal arrowhead was placed by its point to his feet. Within a gap of two wooden logs in the middle of box floor, we could uncover a broken piece of metal object 20.5 cm in length and 1.5 cm in diameter. Around it, a number of similar pieces flat, semi-circle, cone etc. unknown for their use were found. There are some evidences on the surface of wooden logs that they were inserted into them. The approximate size of box is 1.8 m in length, 76 cm in its upper head part and 46 cm in its lower feet part in breadth. The remains of wooden box shows that the box bodies had been joined by one kind of mortise. As we excavated along the exterior surface of the box, we could reveal other two object, one similar to the objects found from the interior feet part and one bronze artifact, in coarse sandy soils. We assume from the position of human





Artifacts from Tarimalt Tomb No.02
1. Metal arrowhead;
2-3. Bronze buckles;
4,5,6,9,10. Bronze ornaments or pendants;
7-8. Bronze rings;
11-12. Bone psalia

Fig. 5

bones especially of lower bones such as shin that when it was looted later, the robbers pulled from a head of the dead body. After continuing the excavation, we reached the natural sediments and stopped it.

Brief definition of artefacts found in a burial is the following:

1. Ear of a bow (1). Well preserved ear of a bow made of bone. It is 140 mm in length.

2. Wooden toggle (2). The large one is 22 cm in length with two holes. The space between them is 22 mm. They are on average 11×4 mm. It is very badly preserved, broken into three pieces. The small one has a hole 55 mm in diameter in the middle.

3. Bronze stud (7). Used for belt decoration. One of them is moderately preserved and 30-32 mm in daimeter. Its loop hole is 15×10 mm. The rest six studs are badly preserved or very corroded. Their loops are lost.

4. Bronze belt buckle (1). Badly preserved and 31×26 mm. Its one end is circular; another one is cross-shaped.

5. Bronze belt ornament (1). moderately preserved. It has a loop 42×10 mm in size. Used for decorating a tip of leather belt.

6. Piece of wooden box (1). 20.5 cm in length. It has a hole 1.5 cm in diameter probably used for inserting a pointed metal object.

7. Metal arrowhead (1). Bad-presesved. Only a part of joining to shaft of an arrow.

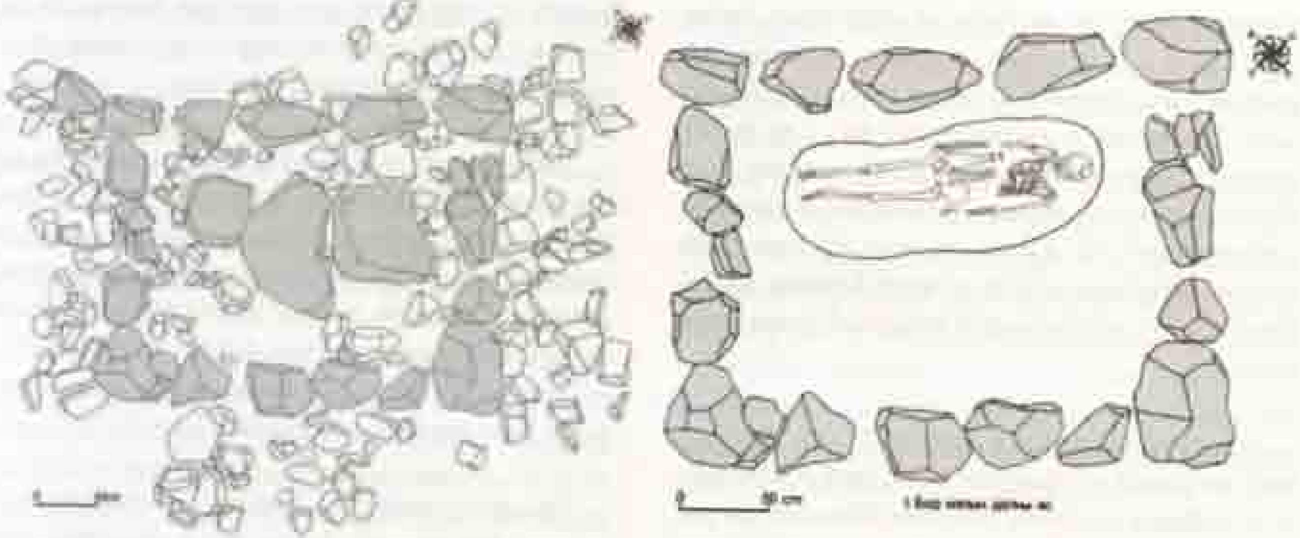
Tarimalt Tomb No.02. This tomb (N 45° 03' 47.2", E 100° 27' 11.3", elevation 1413 m) is located 500 m northeast of Tarimalt Tomb No.01.

The Tarimalt Tomb No.02 is encircled by a ring of medium-sized stones. The cover stones assembled relatively on its southeast edge. The diameter is 6 m. We tested the 2×2 m pit in the center to a depth of 20 cm below the surface, where a big plug stones inclined with 30° angle is exposed. After taking the plug stone off, we did not reveal any burial pit, but excavated further to a depth of 190 cm below the surface. Here we could find some bones of human hand on the northern side of the pit. Further at a depth of 20 cm, we uncover some pieces of wooden box cap: there did not find logs of its lower part, but some pieces of its upper part. At a depth of 240 cm, we revealed floor of the wooden box built by narrow logs. The dead body must have been placed on the floor. Outside the wooden box, we found some bones of human femurs, radiuses and hand, two tri-blade arrowheads, a broken metal knife into some pieces, a piece of quiver, a metal hoop of box, and metal items unknown. It mean that the tomb was looted.

After that, we continued the excavation in front of the wooden box, where well-preserved skeleton of a horse was revealed with its harness and saddle. The horse had been placed in the position of directing to the southeast, turning his face to the south by its side, and bending his knees. Because the saddle was decayed or very broken, it was hard to take it safely for us. Two stirrups have been found close to horse's breast, a bit in the mouth, a bronze buckle of bridle, two bone psalia around the head and other ornaments in other places. From the fact that bones of human hand were found mostly around the horse's feet we conclude that the dead body had been placed first by his head to the southwest or to Mts. Ikh Bogd Uul. We continued the excavation to the natural sediments, but no other artifact is found.

Brief definition of artifacts found in a grave is the following:

1. Parts of Harness:



Plan of OR-85

Burial in OR-85 (1 – Scapula of a large domestic animal)

Fig. 6

a) Bone psalia (2). From the remains on the tip, they are made probably by inserting metal object into animal horn.

b) Bronze buckle (2). Because the large one with leather stuff was revealed back to horse head, it is of rein according to our assumption. The small one is of headpiece.

c) Bronze ring (2). One is not damaged, but another one is broken. The broken one is 1.3×2.1 cm in size.

d) Bronze ornament (5). They were used probably for decorating straps of harness. They have two loops in the other side. They are similiar by size and pattern two by two.

2. Metal arrowhead (2). The form of one arrowhead is unknown because of much corrosion. Another one is corroded, but it is clear that it has a tri-blade.

3. Broken pieces of metal knife. It is approximately 30 cm in length, 2 cm in width. Because wooden stuff fragments are revealed close to the place that the knife was found, we assume that it had a wooden case.

4. Remains of metal hoop of box. Four and five broken pieces of thin metal box hoop measuring 2.3 cm in width. It is possible that they were used for fastening the box.

Structures excavated in the year of 2006

OR-85. The slab grave is situated 344 m north of OR-92. The location is N 45° 02' 22.5", E 100° 34' 31.2", elevation 1245 m. It is enclosed by twenty five slab stones, larger and smaller. There is one large standing stone at its each corner. Inside the slab enclosure there are three overlapped big stones: 45×80×90 cm, 60×70×115 cm and 35×56×62 cm from the northern part.

We decided to test a 5×5.5 m pit for excavation. After the removal of the shallow ground surface we measured both exterior and interior sides of the slab enclosure: the exterior one 2.5×3.2 m and the interior one 1.7×2.5 m. Although we tested a few pits in the outside, we encountered always the natural sediments at about 15 cm depth. Thus the excavation was continued inside the enclosure of slabs where darker sediment of a burial postpit began to be recognized gradually at a depth of 20 cm on its north and west sides. The postpit is measured as 0.8×1.7 m. In the process of the postpit excavation we encountered some fragments of both human and animal bones, in particular a human front tooth, a larger fragment of human tooth root, an ankle-bone or talus of small domestic animal (lamb or kid?), and fragmented remains of human lower limbs.

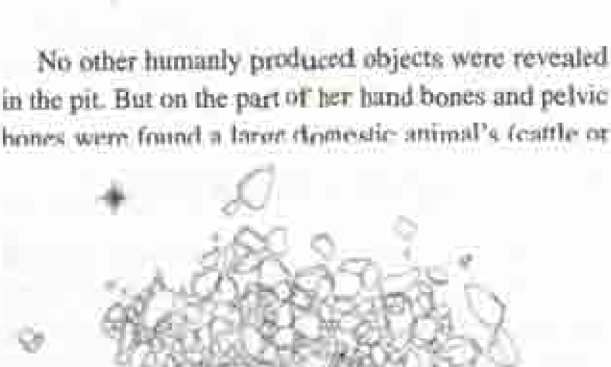
A man was buried at a depth of 54 cm. The dead body are placed on the ground by his back horizontally in a northeast-southwest direction. His arms are put straightly along the body; two legs stretches to full length. The skeleton is almost complete, but some small bones of limbs transferred by rodents are found everywhere in the burial pit. The excavation shows that the burial postpit was filled with both pebbles and soils.

No other humanly produced objects were revealed in the pit. But on the part of her hand bones and pelvic bones were found a large domestic animal's (cattle or horse?) scapula whose apex part was directed to his head: a 1.5×9×12 cm small supporting stone or *der-e cila'u* (lit. pillow stone) under the head.

The preservation of all human and animal bones are very poor. The height of the dead body is 160 cm. The length of the scapula is 32 cm: its apex 5 cm and its posterior surface 16 cm. The sutures have not fused completely, the teeth erosion, and an M3 molar tooth not having appeared yet show that the deceased is 15-20 years old. It seems that the proportion of skull and pelvic bone proves the deceased to be *male*.

The above-mentioned features has enabled us to assume that the slab burial was both looted and associated by other human made objects.

OR-92. A grave is located southwest of OR-91a or at N 45° 02' 19.6", E 100° 34' 32.5", elevation 1253 m. After clearing the modern surface away in an 7×7 m area, the dimension of the grave was measured as 4.9×5.5 m. The level of cover stones is 50 cm in width. The structure is slightly concaved in the center. An


Plan of OR-92

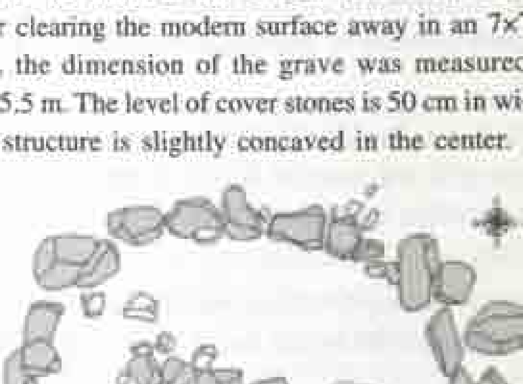

Cover stones and a burial postpit of OR-92

Fig. 7

oval-shaped big stone is installed vertically into the soil respectivley at each of its corner, but all except the northwest vanished one have falled down to a certain extent on the ground: the northeast one falls down to the east, the southeast one to the south, but the southwest one inclines a little at its base. We numbered all the standing stones from the northeast: 1) 26×40×60 cm, 2) 27×38×83 cm, and 3) 36×40×52 cm.

After the first clearing of cover stones in the outside of the enclosure, the dimension of the grave was measured as 3.9×3.95 m in a north-south direction. Because no item was revealed during the excavation in the outside, we focused our attention on its central part or inside the enclosure. The removal of the Layer-2 cover stones shows that there is a burial box of stones in the center. Then we took box's cover stones away and continued the excavation inside it to a depth of 20 cm where we encountered a small burial postpit (56×47×64×160 cm). The burial is thinner in its central part or at a distance between two tips. The more deep we excavated the postpit, the smaller its size turned into. At a depth of 10 cm below the previous layer, small fragments of human bones were uncovered, but no other items was occurred further to a 40 cm depth of natural pebble-bearing soil. We come to judge from the burial box's size and bone fragments that, it was of a child.

OR-144. A khirigsuur is encircled by ring outer fence 15 m in diameter. The central mound is 5.6 m in diameter. It is located at N 45° 02' 33.3", E 100° 34' 48.2", elevation 1231 m.

After clearing the cover stones away, it comes to be recognized that those small stones had been laid out at first as coverings by ancient people. It has been enabled us to assume that the layer consisting of small cover stones inside the ring enclosure has accumulated around the centre over time as a mound.

In order to draw a profile of this distinctive structure of khirigsuur we divided the area into two parts in a west-east axis and then cleared cover stones away in a 50 cm wide area along the axis. The structure consists of four layers. The first layer is formed by stones which enclose the burial box. The second one represents cap stones which close the burial box. The large cover stones of the box form the third layer. The fourth one is represented by stones which cover the whole area of the khirigsuur on the ground. The cleaning of the mound cover stones indicates that so large box of stones that an adult man can be buried stretches in a west-east direction. The box is built by oblique-shaped smooth stones and is closed with large oval stones.

When we took the box cap of stones away and continued the excavation inside the box, some phalanges of human hands and feet are found in the central and east parts. Then we removed all the stones of the box because there was not enough space that one could not continue the excavation inside it.

There was no stone, but much of accumulated sandy sediments inside the box. After clearing the sediments away, we unearthed an intact human burial placed by his head to the west. His face turns to the south by its side. Around the lower part especially between femurs appears rodent's holes, so that the structure around is very disturbed. It should be noted that some small bones of lower limbs were revealed from the breast part. We assume that those bones were transferred there by rodents.

Above the left eye-socket or on the surface of frontal bone there is an oval-shaped hole, the mark caused probably by a powerful hit of pointed weapon. It seems that it was the cause of his death. As the funeral practice is concerned, the departed man is placed by his back on the ground to the west. His face turns by its right side to the south or to an adjacent mountain. The box is enclosed and closed by large stones. After that, three rows of some additional stones are covered on the box.

The box is surrounded in the form of a ring by small stones as a fence in the outside. Inside the fence a number of small stones are laid out on the ground surface of whole structure.

No other remains were found in the burial. In other words it was not associated by other human made objects.

We made paleoanthropological analysis on the skull. The skull was much broken. The following bones of the skull are relatively intact: upper part of the eye-socket orbits, parietal bone, and other constituent bones such as temporal bones, occipital bone, left zygomatic bone, nasal bone and left part of mandible.

The following bones of the body are accessed: pairs of collarbones, pelvic bones and humerus, sacrum, breast bone, thoracic and lumbar vertebrae, complete left and right rib bones, glenoid cavity of the left scapula, atlas and axis of the cervical vertebrae, kneecap, some middle and distal phalanges of hand and foot, two femurs, and a pair of tibia and fibula broken due to the transfer situation.

We could establish the age and sex of the dead body on the basis of Bass's (Bass M. William. *Human Osteology: Laboratory and Field manual*. USA, 1995) and Brothwell's (Brothwell D. R. *Digging up bones*. New York, 1981) methods, but it is impossible to make the height clear due to the fact that lower limbs are very broken. The sutures not having fused completely and the teeth erosion indicate that the deceased is 35-40 years old. The pelvic bone, mastoid process of temporal bone and well-developed brow ridge show that the deceased is *male* and mongoloid.

Due to the badly preserved, heavily broken bones found in OR-144, it is impossible to make both osteological and craniological analysis on the skull and lower limbs.

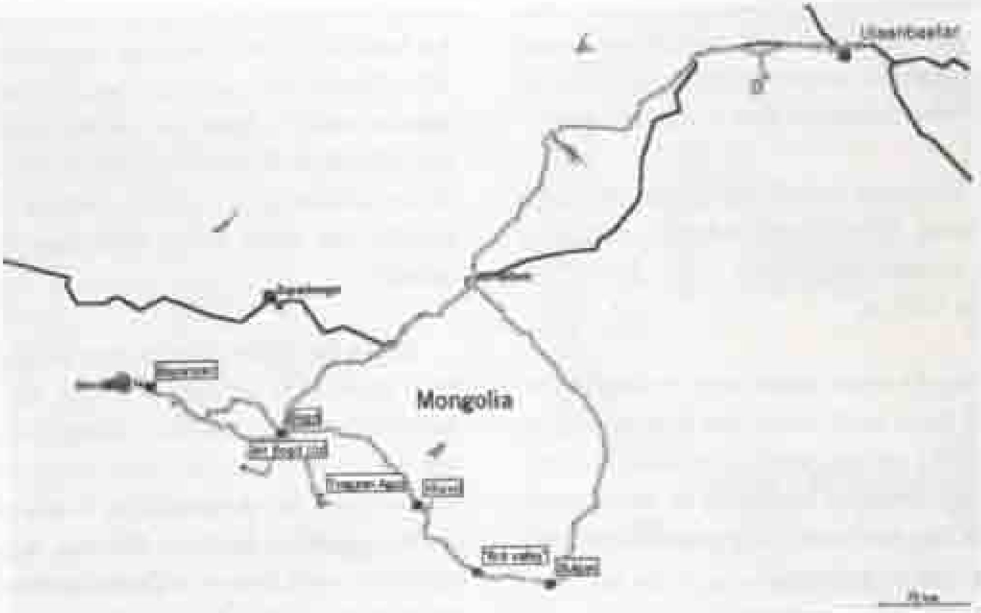


Fig. 8: Surveyed route by the Joint Geo-archaeological Expedition CNR-MAS during August 2004

Appendix

Preliminary Report on Mineralogical and Pollen Analysis of the deposits from Orog Nuur Lake, Mongolia

The salt water Orog Nuur lake in Mongolia is at the end of the Tuin Gol River, which passes through Bayankhongor aimag and ends in the basin parallel to the Gobi Altyan mountain range. Also referred to as Shar Burd Nuur is nestled in the foothills of Ikh Bogd Uul (3957m) in Bogd sum, about 41 km from Bogd town. At 1210 m altitude, Orog Nuur lake (54 square miles/140 sq. km) is one of the biggest lakes in the aimag (Pl. 1). Studies of satellite imageris and archaeological explorations have revealed that the lake was many times larger than the present size. Hundreds of human burials of iron and bronze ages close to the lake reveal that the lake must have supported the human life in the past. As a part of Joint Geo-archaeological Italian-Mongolian investigations, the study of the sediments of Orog Nuur lake was undertaken to know the climatic history of the past as reflected in the changes in the mineralogy and pollen contents in the lake sediments. Some work has been initiated earlier by Gegeensuvd (2004).

The sediments were collected by taking a trench (1x1 m) about 500 m inside the north-western periphery (Lat. 45° 04' 42.5" N and Long. 100° 34' 56.8" E) of Orog Nuur lake (Pl. 2). The sequential and undisturbed sediment samples were collected at a specific interval of 10 cm from freshly exposed stratified section. A total of 19 samples were collected from the profile of the trench from surface to the bottom by taking maximum precaution to avoid contamination. After 2 meters, the samples could not be collected due to the occurrence of ground water. After proper documentation all samples were subjected to mineralogical and pollen analysis.

Methodology

Mineralogical Analysis

All samples are clayey, silty having neutral pH. The lowermost layer, however, is alkaline with 8.0 pH. XRD analyses of Orog Nuur lake sediments were carried out at the Deccan College Research Institute, Pune, India, using a RIGAKU DMax IIVC XRD System, operated at 45 KV, 30 mA, at a scan speed of 2'/sec. Mineralogical analysis was done by search-match program of the XRD machine. All sediments were mineralogically similar containing varying amounts of chlorite, muscovite, quartz and plagioclase. Relative percentages for each mineral were computed to understand their variation in the sediments (Table.1). The mineral pattern of the sediments is typical of the weathering of local rocks such as granite and gneiss which occur in the adjacent Gobi Altyan mountain range. Calcite was also present in the lake sediments in varying amounts.

Pollen Extraction

The samples were treated with various chemicals for extraction of pollen according to the maceration technique described by Faegri and Iverson (1964), Traverse (1988) and Deotare (1995) specially designed for minerogenic sediments as all samples from Orog Nuur Lake are mineral rich.

Samples were treated with 10% Hydrochloric acid (HCl) to remove carbonates and 10% Sodium hydroxide (NaOH) solution to dissolve unwanted organic matter and at the end with hot Hydrofluoric acid (HF) to remove silica. Finally glycerol treatment was given to make the processed palynomorphs moisture free. Thus slides were prepared by mounting them in glycerin jelly and observed under binocular microscope (CARL ZEISS, JENAMED2) for observation, identification, counting and documentation. Unfortunately it was not possible to have modern plants from the surrounding of the study area. But with the help of available resources, we have identified pollen at family level and some of them remained unidentified due to poor preservation and lack of modern reference collection from Mongolian flora.

Results and Discussion

Mineralogical analyses of the Orog Nuur sediments have shown that all samples from top to bottom are mineralogically similar with different relative contents. Clays containing chlorite and muscovite/ illite are typical are typical of those derived from the granitic rocks. Quartz and anorthite contents are nearly are varying but shows maximum at the lowermost sample (180 cm). Presence of fine grained calcite in these samples is the only indicator of the climatic change. Variations in calcite can be attributed to climatic fluctuations. Calcite has shown sharp increase at 100 cm depth (Pl.3). Another high value is observed at 160 cm. The periods corresponding to these depths could belong to drier climates indicating fluctuating climate.

The overall recovery of pollen is good except fungal spores which are relatively less. Pollen recovery in samples from middle and upper level are fairly good and thus yielded well preserved pollen grains except two sample from bottommost (170-180 cm and 150-160 cm) level where mineralogical analysis has shown increase in maximum quartz and anorthite contents. It is observed that the first 3 samples from top contain high proportion of microfossil and it decreases with depth till sample no. 8 (70-80 cm depth) and again increases up to the depth of 150 cm i.e. sample no.15

Several pollen types have been noted and all are in good state of preservation may be because of near neutral reaction of the deposits and relatively more organic matter indicated by their colour. The pollen types have been identified and recorded on the basis of their morphological features and they are listed in Table 2.

It instructive to compare the results of pollen analyses of the sediments from Indian Thar desert. This project mainly deals with the palaeoenvironmental history of Kanod and Bap-malar playas located in western part of Rajasthan, India. These studies on the Bap-Malar and Kanod playas in the arid core of the Thar desert indicate that they remained saline throughout their existence i.e.18 ka to 6 ka and dried up at least 1000 years earlier than the playas in the eastern part of desert (Deotare et al. 1998; 2004a; 2004b; Kajale and Deotare 1997, Kajale et al. 2004). Though these studies mainly confined to the western part of Rajasthan of the Indian Thar desert, the Orog Nuur Lake sediments and pollen data may not be comparable due to their geographical location but some similarities are noted so far as climatic interpretation is concerned.

The pollen being plant oriented and microscopic male reproductive entity of flowering plants remains intact years together and are recoverable from the sediments. It is one of the best and most reliable parameter available in the present context to study vegetation and climatic aspect of the past.

In the present study, main objective was to test the potentiality of pollen in Orog Nuur Lake deposit, which is proved beyond doubt by recovering well preserved microfossils (Pl. 4-6). The significant recovery of these pollen grains is most probably because of near neutral reaction of the clayey deposit. After comparing the fossil pollen grains with modern one it is observed that the most of the pollen grains belong to the typical members of wet plants.

The uppermost level (0-20cm) shows the significant pollen grains of the families Tamaricaceae, Poaceae, Cyperaceae, Chenopodiaceae/ Amaranthaceae, Euphorbiaceae, Myrtaceae indicating vegetation of grassland.

The upper level (20-80 cm) shows the dominance of pollen grains belonging to the families of Verbenaceae, Anacardiaceae, Combretaceae indicates the typical members of dry deciduous plants.

The most dominant plants at the middle level (80-130cm) belong to the families like Myrtaceae, Fabaceae, Anacardiaceae, Euphorbiaceae, Bignoniaceae and Magnoliaceae indicating wet evergreen climate.

After comparing the fossil pollen grains with modern one it is observed that the most dominant plants at the lower level (130-180cm) belong to the families like Cyperaceae, Myrtaceae, Poaceae, Anacardiaceae, Asteraceae (Compositae) with some fungal spores indicating wet humid climate.

Pollen recovery from the bottommost samples i.e. sample no. 18 (170-180cm) and 16 (150-160cm) is almost nil because of relatively high alkaline nature of the deposit.

Overall pollen grains of Amaranthaceae/ Chenopodiaceae, Cyperaceae, Gnetaceae, Poaceae and to some extent Asteraceae (Compositae) are found throughout the profile indicating mixed flora i.e. wet and dry. For example Amaranthaceae/Chenopodiaceae, Cyperaceae, Poaceae indicate wet climate whereas pollen of Ephedra (Gnetaceae) can grow in semi-arid to arid climate. It is therefore on the basis of pollen data so far identified and the nature of sediment suggests that the climatic condition at Orog Nuur Lake seems to be fluctuating. Although the dates for these sediments are not available, there seem to be continuous water in the lake with periodic fluctuating condition which is reflected in the mineralogical and pollen analyses. Due to lack of reference flora of Mongolia, some pollen grains remained to be identified which will be undertaken in further studies of the sediments.

Acknowledgement

One of the authors , Prof. Vishwas Gogte, is thankful to Prof. Bruno Marcolongo, CNR, Padova, Italy for inviting him to participate in the Joint Italian-Mongolian expedition at Bogd. He is also thankful to Prof. B. Chadraa and Dr. Gunchinsuren of the Mongolian Academy of Science for there hospitality and help in the archaeological explorations.

Table.1: Variation of minerals in Orog Nuur lake sediments with depth

Depth cm	Chlorite Rel.%	Muscovite Rel.%	Quartz Rel.%	Anorthite Rel.%	Calcite Rel.%
0	27.1	50.1	32.7	10.1	21.3
10	48.6	70.8	37.9	25.7	31.3
20	37.8	58.3	34.4	20.1	29.3
30	59.4	58.3	44.8	38.5	38.1
40	51.3	45.8	62.1	31.4	33.3
50	54.1	66.6	48.2	40.7	38.1
60	40.5	58.3	56.8	100.0	25.3
70	70.2	91.6	55.1	64.2	55.3
80	70.2	66.6	53.4	61.4	36.1
90	37.8	45.8	46.5	32.8	50.6
100	37.8	37.5	44.8	24.2	100.0
110	81.1	58.3	41.3	35.7	60.1
120	37.8	62.5	34.4	31.4	49.3
130	62.1	100.0	36.2	30.1	29.3
140	64.8	54.1	48.2	29.2	27.3
150	59.4	70.8	55.1	48.5	47.6
160	48.6	50.1	43.1	34.2	74.6
170	100.0	95.8	27.5	21.4	40.1
180	54.1	41.6	100.0	82.8	12.1

Table 2 : Distribution of pollen types in the profile of Orog Nuur lake

No	Depth cm	A	AN	AS	AT	B	BE	BR	CY	E	F	GN	LL	ME	M	MT	PN	PO	S	T	TP	V	FS
1	00	+	-	-			+	+	+	+	-	+	-	+	-	+	-	+	+	-	+	-	-
2	10	+	-	-	-		-	-	+	-		+	-	-	+	-	-	+	-	-		-	-
3	20	+	-	-	-		-	-	+	-		+	-	-	-		+	+	-	-		+	-
4	30	+	-	-	+	-	-	-	+	+	-	+	-	-	-		+	+	-	-		-	-
5	40	+	-	-	-		-	+	-	-		-	-	-	-		+	+	-	-		-	-
6	50	+	+	-	-		-	-	-	-		-	+	-	-		-	+	-	-		-	+
7	60	+	-	-	-		+	-	+	-		+	-	-	+	+	-	+	-	-		-	-
8	70	+	-	-	-		-	-	-	-		+	-	-	-		-	+	-	+	-	-	-
9	80	+	-	-	+	-	-	+	+	-		+	-	-	-		-	+	-	-		-	-
10	90	+	-	-	-		-	+	+	+	-	+	-	+	+	-	-	+	-	+	-	-	+
11	100	+	-	-	-	+	-	-	+	-		+	-	-	-		+	-	-	+	-	-	-
12	110	+	-	-	-		-	-	+	-		+	-	-	-	+	-	+	-	+	-	-	-
13	120	+	+	-	-		-	-	+	-	+	+	-	-	-	+	-	+	-	-	+	-	-
14	130	+	+	+	-			-	-			+	-	-			+	+	-			+	+
15	140	+	-	-	-		-	-	-	-		-	-	-	-		-	+	-	+	-	-	-
16	150	-	-	-	-		-	-	-	-		-	-	-	-		-	-	-	-		-	-
17	160	+	-	-	-		-	-	+	+	-	+	-	-	-		-	+	-	-		+	+
18	170	-	-	-	-		-	-	-	-		-	-	-	-		-	-	-	-		-	-

A = Amaranthaceae / Chenopodiaceae,
AN = Anacardiaceae, AS = Asteraceae (Compositae),
AT = Acanthaceae, B = Bignoniaceae,
B E = Betulaceae,
B R = Brassicaceae, CY = Cyperaceae,
E = Euphorbiaceae, F = Fabaceae,
G N = Gnetaceae, LL = Liliaceae, ME = Meliaceae,
MG = Magnoliaceae,
MT = Myrtaceae, PN = Pinaceae, PO = Poaceae,
S = Salvadoraceae,
T = Tamaricaceae, TP = Typhaceae, V = Verbenaceae,
FS = Fungal spores,

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Distinctive Architectural Traditions of Temples at Mari Indus

FARZAND MASIH[*]

The hills called Mari in district Mianwali in Pakistan is crowned by the ruins of architectural remains which represents a distinctive temple traditions but unfortunately, has been misinterpreted by most of the authorities (Pl.1). Indeed, very little is known so far about the style and decorative details of this monumental architecture. Similarly, its relationship with contemporary architecture, identifications of their builders, the gods to whom they were dedicated and the precise date of their construction is yet to be thoroughly investigated. In the present paper, the author has devoted his serious efforts to probe into these so far neglected monuments and to ascertain some of the above mentioned questions.

The picturesque hill of Mari, locally known as Maniot from Manikot meaning 'Fort of jewels' is located on the eastern bank of the river Indus in the Mianwali district at a point just above the town of Kalabagh. On the eastern foot of the hill is a village with considerable population known as Mari. On the other bank of the river and on the south-east of the hill is another small village called Kukranwala. The Indus here is a magnificent stream about 180 m broad, running in a small deep channel over small boulders. Being located on the bank of the river, the site of Mari is a *Tirtha* for Hindus, which means a ford, a passage, a place of pilgrimage on the bank of a river, the sea shore or a lake.

In India and elsewhere the temple sites are usually associated with the places where grooves are near rivers, mountains and springs, and in towns with pleasure gardens. Because gods always play in these places (*Brihat Samhita* and *Bhavisyapurana*)

The Mari hill being contiguous to the river bank is an ideal place for the abode of the Hindu god. It is such place where, according to Puranas, gods use to play and feels pleasure to reside. (Pl. 2)

The hill once had been a place of great sanctity. Cunningham writes, a great fair is held on the top of the hill in the month of *Vaisakh* (Cunningham 1882:25)

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Even after the partition of the sub continent, the Hindus used to come here for pilgrimage from far flung areas. On one of the entrances of the eastern group of temple, a figure of Hanuman and a bull stood till recent years.

The access to the top is possible both from the eastern and the western sides of the hills. Nevertheless, climbing from the former side is easier. A narrow track close to the salt mine may help to reach the eastern group of temples. However, while taking this route one should keep in mind that at one point it is indeed dangerous and one has to be very careful while ascending to the top.

Cunningham records that there are no traces of any fort on the Mari Hill, but there are remains of several temples which are sufficient to justify the name of Kafir Kot (Cunningham 1882:25) During our survey work at Mari Hill, however, we came across some remains of a fortification wall. But the most prominent structures are three temples and a completely ruined building. This building has been exposed by treasure hunters at places which undoubtedly represents the platform of a temple. For the purpose of recording, we have classified these into two groups designated as eastern and western group. The former group contains temple A and B while the later has only temple C.

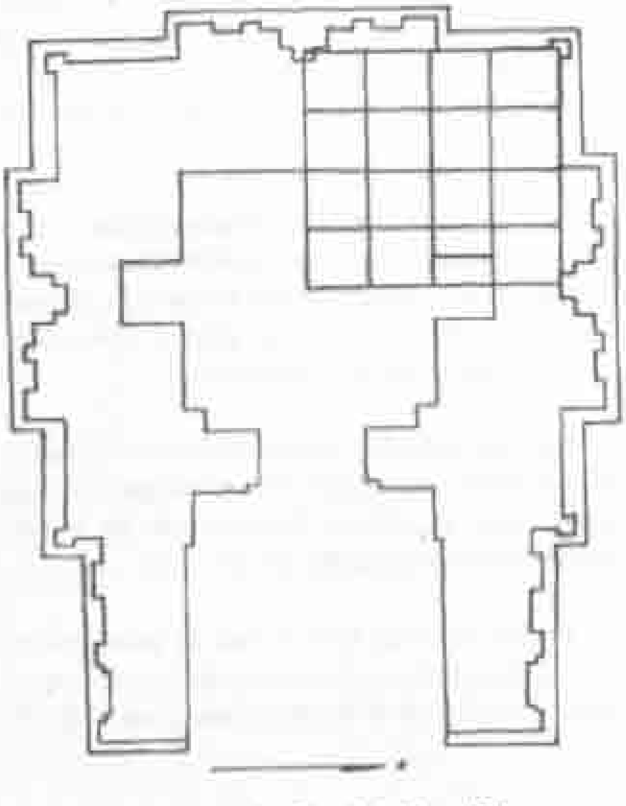

Fig. 1: Mari Indus: Temple A. Ground Plan

In the following lines, temples A and B will be discussed whereas the temple C (Pl. 3) will be dealt in detail some where else.

Eastern Group

This group stands upon relatively on low ground close to the eastern edge of the hill. Most of the decorations and carvings have been, recklessly obliterated by natural forces and human vandalism, but sufficient evidence still remains to understand the style and significance of this group of temples.

Temple: A

This east facing temple stands on a low platform in close proximity to temple B (Pl. 4). On plan it comprises a sanctum and an *antarala* with an arched type entrance (Fig.1). The latter is a square of about 2 m internally and has a barrel vaulted roof. At the junction of walls and vaulted roof is a cornice consisting of saw tooth frieze, plain *patta* and dentil. The former is a square of 1.90 m with small niches both on the northern and southern walls at the ground level measuring 48 cm wide, 60 cm high and 40 cm deep. The walls show successive layers of plasters of mud and lime indicating several stages of repairs. At the top is semicircular domed roof with a lotus in the centre supported by sloping pendentives in each corner.

This striking example shows the continuation of a local idiom developed over the previous centuries, but still with only a single central offset on its walls.

The *vedibandha* consists of *khura, kalasa* an *antarapatta* embellished with square bosses and *pushparatnas* framed by plain *pattas, padmapatras,* a dentil and at the top a *kapota* with *candrasala* placed at equal spaces.

The *dvi-anga jangha* with *bhadra* and *karna* offsets are the most conspicuous part of the temple as besides other things it also accommodates the central niches meant for the idol. The walls of both the offsets are cantoned with pseudo Corinthian pilasters. At the top of the plain square shaft is a beaked block with drooping leaves between two circular stones. The capitals show two rows of leaves three in each. Above this is a thin bracket with one voluted end. The *kati* is topped by a rather routine decorative saw tooth fringes which runs each wall section (Pl.5).

The *jangha* of the *mulaprasada* bears a niche in the *bhadra* offset. The trefoil niche sunk into the masonry, simulates the sanctum and is set above the *vedibandha.* The niche with tapering sides and T-shaped appearance is 32 cm deep and 16 cm and 18 cm wide at the top and bottom, respectively. It is framed by a shrine model which looks like three tiered *udgama.* It comprises horizontal cornices of *kapota* mouldings ornamented by rows of single and half *candrasalas.* Corner *amalakas* are absent in this case. The pilasters that support the *Nagara sikhara* of the shrines model differ in detail from *jangha* pilasters. Here, on top of the square shaft is a thin block slightly projected from the line of the shaft. Above is a single row of three leaves where as at the top is a round bracket which, along with the pilasters supports the curvilinear tower. The *antaraia* walls are also cantoned with pilasters identical to those of the *bhadra* but contrary to the *bhadra* niche. The *antarala* has a blind niche without trefoil and topped by an *udgama* of half and whole *candrasalas.*

The major mouldings of the *varandika* are *kapot, antarapatta* and dentils. The former is ornamented with *candrasalas* two on *bhadra* level and one on *karna.* The *antarapatta* framed by the plain *pattas* is embellished with square bosses and a band of *Puspa* or flower (Pl. 6).

The *dvi-anga* superstructure is typical *Nagara sikhara.* It has a central *madhyalata* with corner *venukosa* on either side. The later is *embedded* with two round *amalakas.* This superstructure shows the usual *candrasala* motif over the *kapota* mouldings. The *madhyalata* of the *sikhara* shows three evenly spaced *candrasalas.* The flanges of those to either side however, are enlarged to frame the central *candrasala,* giving the *madhyalata* a strong central emphasis. In the *venukosa* below the corner *amalaka* is a small *candrasala.* On the top a split *candrasala* begins to simulate a triangular pediment. The cavity of *candrasalas* are filled in with lotus.

Temple: B

Standing on a low platform this temple is almost identical to the previous one (Pl. 7). But in addition, it possesses several interesting features. On plan it consists of a square sanctum and an *antarala* (Fig. 2). The latter has-well intact *praggriva* walls and a vaulted roof.

The entrance to the *antarala* is crowned with a trefoil arch (Pl. 8). Internally it is 2.75 m from north to south and 2. 40 m from east to west. The distinctive feature of this monument is the introduction of figures each seated probably on a lotus. These are placed in corners above the wall cornice and serve as sloping pendentives. These figures are unfortunately so defaced as to render them unidentifiable. However, their crossed legs and clasped hands are indicative of praying gesture (Pl. 9). The ceiling too is distinctive and consists of a shallow dome ornamented with a lotus in the centre (Pl. 10).

The *antarala* is connected with the *garbhagriha* through a doorway about 0.75 cm thick. The entrance hole is 1. 03 m wide and gradually expands towards the inner side making it 1.45 m wide.

The *garbhagriha* as usual is a square measuring 2.50 m aside. The walls here too show successive layers of mud and lime plaster. A notable feature is the pedestal like structural built against the back wall. This tradition generally does not suit the *linga* worship. Instead, this practice was followed by the *Vaishnavite* for placing the idol of a god against the wall. Above the wall cornice in each corner is a corner stone and sloping pendentive. Over it is a wooden beam placed diagonally in each corner (Pl. 11) The ceiling is a shallow dome with a lotus in the middle (Pl. 12).

This *dvianga* temple with *praggriva* walls framing an *antarala* has a trefoil entry. The *vedibandha* consists of a *khura, kalasa,* and a broad *antarapatta* ornamented with flowered bosses and *pusparatnas* in an alternate manner and framed by plain *pattas*. Above is a *padmapatras* and dentil. At the top is a *kapota* decorated with *candrasalas* placed at equal interval.

The *jangha* as already mentioned is *dvi-anga* in form. It has a central *bhadra* projection with *karna* on either side. The *angas* are separated from each other by a light recess. Both *bhadra* and *karna* cantons the pilasters in such a manner that a *catuski* is formed. The *kumbhikas* of these pilasters consists of *kumbha* and *kalasa* mouldings. Above the square shaft is a slightly projecting block adorned with a triangular motif and side flanges. The capital shows a much common design of drooping leaves in two rows. At the top is a thin bracket with voluted ends (Pl. 13).

The well preserved *praggriva* walls are also cantoned with pilasters similar to those *of jangha*. Small sunk niches that simulate the sanctum are set above the *vedibandha* of *bhadra* and *praggriva* walls. These niches are framed by shrine models. Like most of the temples, the *bhadra* niche has sloping sides and the lintel slightly projected from the jambs giving a T-shaped appearance, to the entry. Both the depth and height is 35 cm. At the top and bottom it is 22 and 27 cm wide respectively.

The shrine model framing the *bhadra* niche has a prominent trefoil entry crowned by a curvilinear *Nagara* superstructure. This *dvi-bhumi* Nagara *sikhara* is composed of horizontal *kapota* mouldings ornamented by complete and half *candrasalas* (Pl. 14). This tradition of shrine models used for the ornamentation of the wall has already began to appear at Bilot Kafir Kot temple D.

The superstructure of the *praggriva* shrine models is similar to the *bhadra* shrine model in every detail.

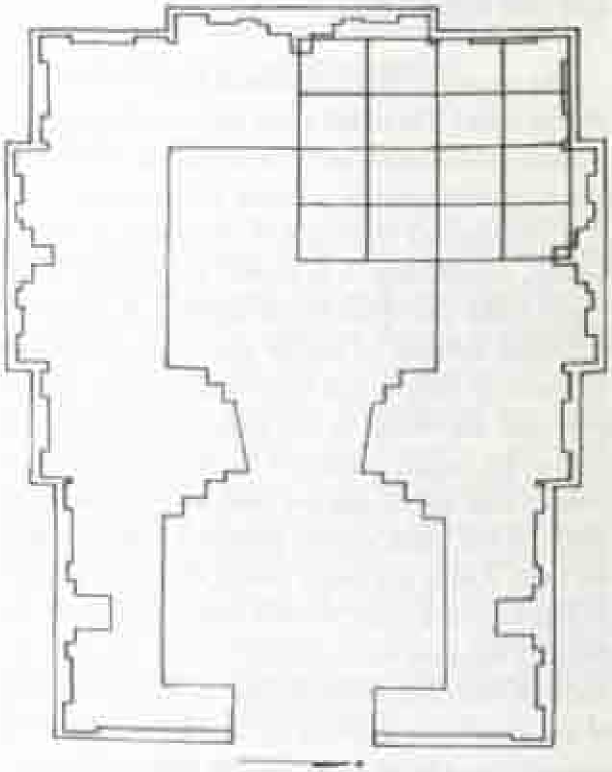

Fig. 2: Mari Indus: Temple B. Ground Plan

But in this case the entry does not show trefoil arch. The pillarets supporting the *Nagara sikhara* have capitals showing drooping leaves in two rows and a thin bracket having one voluted end at the top. Between the pilasters runs a frieze of saw tooth design. Above these is a cornice consisting of *padmapatras* and dentils. The niche hole is much damaged and filled with rubble. This perhaps an unconscious effort, has to some extent prevented further decay of this shrine model (Pl. 15)

The front of the *antarala* with the trefoil entrance partly damaged is quite interesting. On either side of the central foil of the arch is a much abraded figure in a flying posture representing probably the *Gandharva* . Set on the *vedibandha* on either sides of the entrance are *dvarapalas* standing in a *dvibhanga* pose. Both are much damaged.

The *varandika* comprises *padmapatras*, dentils, *kapota* with *candrasaias* and an *antarapatta* decorated with flowered bosses and *pusparatnas* framed by plain *pattas*. Above is another *padmapatra* and a dentil.

The superstructure is curvilinear *Nagara sikhara* with a central *madhyalata* and a *venukosa* on both sides, separated by a light recess. At present only one round *amalaka* is embedded in the latter but actually there was another which is now missing. The cavity of the complete *candrasalas* is filled with *puspa*. Here these are woven together into an interlocking mesh slightly more intricate than on earlier temples, beginning to simulate a triangular pediment.

Geometric principles

According to our estimation the Mandala of temple A and B at Mari Indus show the grid plan of 8 x 8 squares. The thickness of the temples' walls is half of the width of the sanctum which indicates that the construction principles as described in *Brihat Samhita*, a text of early sixth century, were being practiced by the priest builders at Mari Indus. Except entrance side, the other three cardinal sides show central divinity. These central projections of each wall measures the interior dimension of the sanctum and do not reflect on the exterior the significant portions of an interior altar. The degree of projection for these offsets is a half square. Dr. Meister is of the view that the projection of the wall from the square do not reflect a rule. The degree of projection varies from temple to temple. It would seem a measure pragmatically determined rather than one of the ritual significance.

Style

Like its counterparts in the Salt Range (Fig. 3) the temples A and B at Mari Indus can confidently be placed in the category of *Nagara Sikhara* temple. The *Sikhara* is the most distinctive part of the *Nagara* style temples and provides the bases for the most useful and instructive classification. The two basic types of *Nagara Sikhara* are the (1) curvilinear *Latina* and (2) the rectilinear *phamsana*. The temples under discussion are true representative of type 1 i.e. the curvilinear *Latina*. Here the *Sikhara* is a single spired tower, *ekandaka*, that is compared to the single "egg of creation" (Meister: 99). It is known in the *Vastusastra* as *lati* or more frequently *latina*.

The study of the Salt Range temples has now revealed the truth that these temples have also contributed a significant role in the origin and development of the *Nagara Sikhara* style. Temples A and B at Ketas and North Kafir Kot undoubtedly represent beginning of the *Nagara Sikhara* with distinct architectural forms and decorative motives which are deep rooted in Gandhara architectural and decorative traditions. Temples A and B at Mari Indus with *dvianga jangha* and *dvianga* superstructure with central *madhyalata* and prominent *Venukosa*, particularly, illustrate a stage where *Nagara Sikhara* has already attained its fully recognizable form in the Salt Range.

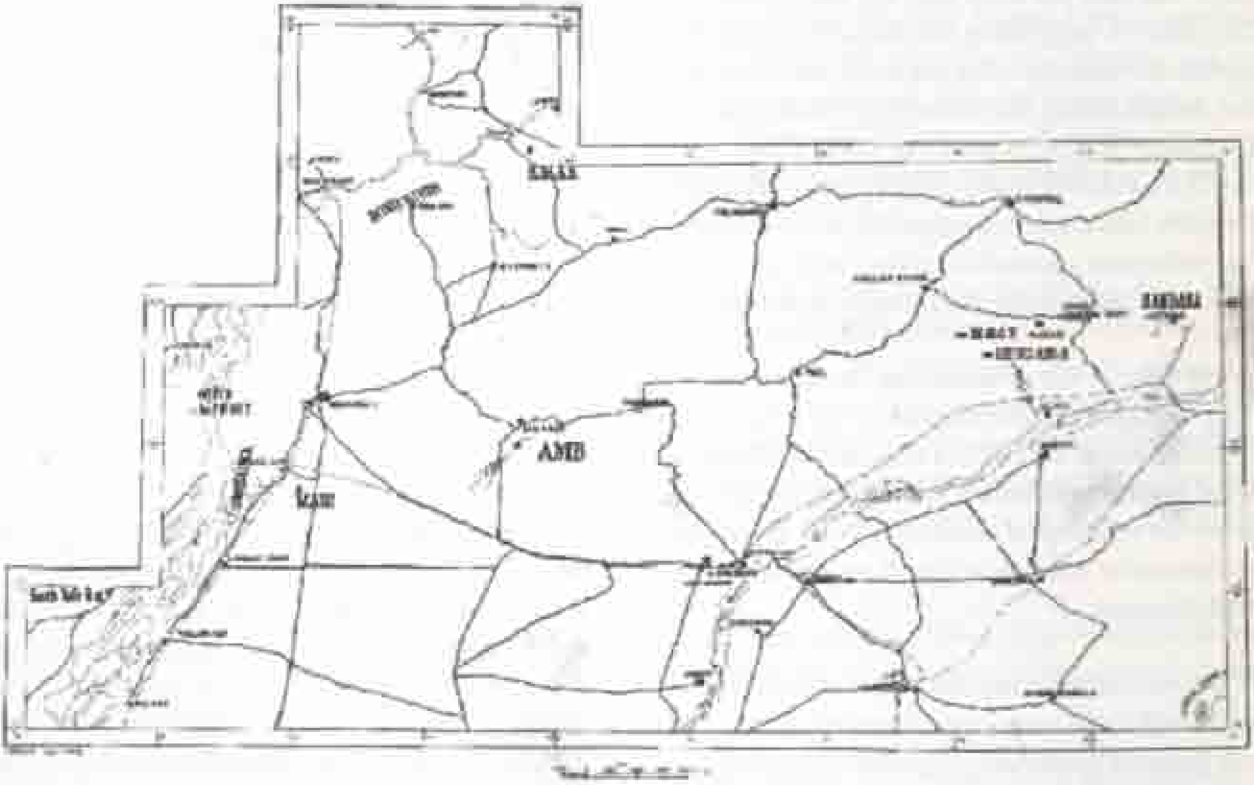

Fig.3: Location Map

These extremely dilapidated temples preserve the evidences of continuation of Gandhara architectural and decorative trends and hence witness the fully emerged Gandhara *Nagara Sikhara* in the Salt Range.

Chronology

No satisfactory chronology for the temples of the Salt Range and Kafir Kot has been established so far. Most prominent scholars in the past bracketed these monuments between the eighth and tenth centuries A.D. But this was at the most a learned guess. As a matter of fact, we still await a proper chronological analysis of these temples. It is unfortunate that no epigraphic evidence has yet been found to solve this elusive problem. Similarly, nothing much is available in the form of historical or numismatic data to suggest a time scale. Moreover, these temples, regrettably, remained neglected for a very long time both by scholars and by custodians of antiquities. As a result, most of the potentially diagnostic chronological features have already disappeared.

Under these circumstances, it is difficult to suggest a precise date for these temples. Nevertheless, the style and architectural development of the temples yield important clues that can be used in attempting to establish a provisional chronological framework. It is on the basis of these notable clues(Masih 2000 :246-58) that temples A and B at Mari Indus may safely be bracketed in 8th century A.D.

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Excavated Chalcolithic Sites in Gujarat: An Appraisal

Rajesh S.V. and Ambika Patel*

Chalcolithic studies in Gujarat commenced in 1930's following the discovery of remains of Indus Valley Civilization at Harappa and Mohenjodaro. The first excavated Chalcolithic site in Gujarat was Valabhipur (Anderson and Afonso 1990). It was followed by the excavation at Rangpur by M.S. Vats (1936:34-38). The site was subsequently excavated by Ghurye (Ghurye 1939:12) and Dikshit (Dikshit 1950:35). The excavations of Rangpur and Lothal by S.R. Rao of the Archaeological Survey of India in 1950s set the archaeological researches of Gujarat on a new line and it became the focal point of Proto Historic studies. Rao's work in Gujarat has been carried forward by various Departments/Institutions namely, Archaeological Survey of India; The Maharaja Sayajirao University of Baroda; The Deccan College, Pune; The State Department of Archaeology, Gujarat and some Foreign Universities/Personnel and they brought to light a plethora of data covering a time period of 3500BC-1000BC with more than 750 sites belonging to various periods of Harappan Culture and Regional Chalcolithic Cultures.

Pre Harappan and Pre Urban Harappan Period (3500-2600 BC)

In the initial stages of the Chalcolithic studies it was assumed that the earliest agricultural communities of Gujarat were associated with the Mature/Urban Harappan period (Sonawane 2000:137-146). Excavations conducted at Loteshwar, Dholavira, Padri and the analysis of cultural materials from Surkotada, Prabhas Patan and Lothal has indicated that prior to the influence of Harappan culture, Gujarat was inhabited by regional non-Harappan Chalcolithic communities/ Pre Harappans. Bhan (1994:71-90) observes that the non-Harappan ceramics were reported from the earliest levels of these sites and they continue up to the Late Harappan phase in different sites of Gujarat. Calibrated radio carbon dates for this period from Loteshwar, Padri and Prabhas Patan go back to the second half of the fourth and the beginning of third millennium BC (Sonawane 2000:137-146). The evidence from Lothal suggests that the Chalcolithic people used micaceous red pottery, which is different from the Harappan ceramics. The excavations at Nagwada in the Rupen river valley have yielded the evidence of a human burial, belonging to the Pre-Harappan period. The site also yielded pottery, which has similarities with the pottery from the earliest period (Pre-Urban Harappan level) at Amri in Sindh and this pottery can be assignable to 3000-2600 BC (Dhavalikar 1995). Excavations at Datrana in North Gujarat have revealed different types of pottery i.e., a set of pottery similar to the Pre-Prabhas (3000-2800 BC) type, the Anarta/north Gujarat pottery type and the Early Harappan (Pre Urban Harappan) pottery reported from the burials at Nagwada and Santhli (Ajithprasad 2002:129-158). All these reveal that there must have been an indigenous population established before the influence of Harappan culture in Gujarat.

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Urban Harappan Period (2600-1900 BC)

As a result of the archaeological studies, two distinct categories of settlements were identified in Gujarat during the so-called Urban Harappan phase. According to Possehl (Possehl 1992:117-154) they are the sites with Classical Harappan traits and sites with regional manifestation of the Harappan (Sorath Harappan) domains respectively. It is notable that in more than seven hundred and fifty sites in Gujarat with different degrees of Harappan affiliation, settlements representing the Classical Harappan are few and most of these sites show some amount of Regional Chalcolithic influences. Some of the sites of the Urban Harappan phase were engaged in craft production and the manufactured goods of these sites include items of semiprecious stones, steatite, faience, shell, and copper and some of them may be acted as trading centres. Sites like Dholavira, Lothal and Surkotada have revealed evidences of monumental architecture, social stratification, writing and developed artistic styles.

The Post- Urban Harappan Period (1900-1000 BC)

The Post- Urban Harappan period in Gujarat is represented by cultural periods Rangpur III, Prabhas Patan III and Rojdi C. Scholars defined this period on the basis of the increase in the frequency of pottery types like lustrous red ware, painted black and red ware and coarse red ware (Bhan 1994:71-90). The urban to post urban cultural transformation is reflected in the lithic artifacts too. The inferior quality blades of local chert replaced the Sukur Rohri Chert blades (Sonawane 2000:137-146). Deterioration in urban settlement pattern is also very clear and radiocarbon determinations date the whole phase to 1900-1000 BC.

Excavated Chalcolithic Sites

Among, more than 750 sites reported in Gujarat 39 are excavated (Map). The excavated Chalcolithic sites in Gujarat are Dholavira (Bisht 1991:71-82, 2004:35-48), Surkotada (Joshi 1972:98-144, 1990), Pabumath (IAR 1965-1966), Shikarpur (IAR 1963-1964), Desalpur (IAR 1963-1964), Juni Kuran (Pramanik 2003-2004:45-67) and Kanmer (Kharakwal. *et. al.* 2005:115-123) in Kutch; Rojdi (Possehl and Rawal 1989), Kuntasi (Dhavalikar *et. al.* 1996), Bagasra/Gola Dhoro (Sonawane *et. al.* 2003:21-50; Bhan *et. al.* 2004:153-158) Pithad/Jaidak (IAR 1959-1960, 1990-1991; Ajithprasad 2003), Nageshwar (Hegde *et. al.* 1990), Lakhabawal (Rao 1963:1-250), Amra (IAR 1955-1956), Babarkot (IAR 1955-56, 1990-1991), Oriyo Timbo (Rissman 1985; Reddy 1991:79-81), Rangpur (Rao 1963:1-250), Lothal (Rao 1979, 1985), Vagad (Sonawane and Mehta 1985:34-44), Kanewal (Mehta *et.al.* 1980), Nesdi/Valabhi (Mehta 1984:243-251), Padri (Shinde 1992a:79-86, 1992b:55-86; Shinde and Kar 1992:105-110) Valabhipur (Anderson and Afonso 1990), Bet Dwarka (Gaur and Sundaresh 2003:57-66), Bokhira (Gaur *et. al.* 2006:33-39) and Somnath/Prabhas Patan (Nanavati *et. al.* 1971; Dhavalikar and Possehl 1992:72-78) in Saurashtra;

Loteshwar (IAR 1991-92; Bhan 1994:71-90), Motipipli (Majumdar and Sonawane 1996:11-17), Santhli (IAR 1993-94), Datrana (IAR 1994-1995, 1995-1996), Zekhda/Jekhda (Momin 1983:120-125), Nagwada (Hegde *et. al.* 1988:55-65), Ratanpura (IAR 1984-85; Bhan 1989:219-242) and Mathutra (Majumdar 1999) in north Gujarat; Malwan (Rao 1963:1-250), Jokha (Mehta and Chaudhary 1971), Dhatwa (Mehta and Chaudhary 1975), Megham (Rao 1963:1-250) and Bhagatrav (Rao 1963:1-250) in south Gujarat. Of these, Dholavira, caught the attention of many archaeologists and non-archaeologists due to its size, architecture and varieties of material remains. The other sites are also equally important, as they have yielded significant features in terms of their architecture, location, chronology and craft activities (Rajesh 2003:221-233).

Amra

The excavation at Amra (22° 16' N, 69° 56' E), situated in the Jamnagar taluka of Jamnagar district by The Maharaja Sayajirao University of Baroda revealed three fold cultural sequence, i.e., period I, II& III. Period I is Chalcolithic and yielded ceramic types like red, buff and black and red ware. Clay balls, grinding stones, spindle whorls, pottery discs, stone balls, copper rings, shell bangles and beads of terracotta and semiprecious stones were also recovered from the site. Period II yielded the Early Historic cultural materials including red polished ware and black painted red pottery while Period III dates late (IAR 1955-56).

Babarkot

G.L. Possehl of USA and M.H. Raval of State Department of Archaeology Gujarat undertook excavation at Babarkot (22° 16' 04" N, 71° 34' 15" E) situated on the Gomanadi in Paliyad village, Botad taluka of Bhavnagar district. The site is on 2.5m high mound spread to an area of 2.7 hectares. Upper most stratum contained rich brown soil having early historic artifacts and Medieval objects. The lower stratum of brown soil yielded Harappan artifacts datable to 2200-1700 BC. Remains of the fortification wall, having foundation partly of stone and partly of black cotton soil were encountered in the southern and western periphery of the mound. The width of western fortification wall was 4.5 m and the same at the southern end was found to be 3 meters wide. One trench revealed the remnants of a floor. One complete pot, grinding stone and remains of a hearth were found on the surface of the floor. Apart from potsherds of red and buff wares, grinding stones, chipped stones, microlithic blades, beads, worked pot sherds, metal objects and shell bangles were also recovered. Seeds of summer/khariff crops like Panicum sp., Setaria sp., Eleusine sp., Enchinocola sp. were also unearthed. Animal bones recovered from the site are of zebu, water buffalo, sheep, goat, pig, dog, fowl, blue bull, black buck, gazelle, four horned antelope, mongoose, hare, rat, lizard and fresh water turtle (IAR 1990-91).

Bagasra/Gola Dhoro

Bagasra (23° 03' 30" N, 70° 37' 10" E), the Harappan site, locally known as Gola Dhoro is situated about half kilometer southeast of the Bagasra village on the southern shore of the Gulf of Kutch in Maliya taluka of Rajkot district. This site was first reported during a joint exploration carried out by the Deccan College, Pune and the Gujarat State Archaeology Department in late 1980's. In July 1995, the Department of Archaeology and Ancient History, M.S.University of Baroda, conducted a brief surface survey at the site for assessing its potential for excavation and further research. This survey identified this site as a well-preserved Mature/ Urban Harappan settlement incorporating cultural traits of the Sorath Harappan of Saurashtra and the Regional Chalcolithic/Anarta assemblage of north Gujarat. The material remains unearthed from excavations in each field season from1996-2005 at this site proved several interesting aspects of a fortified settlement of the aforesaid period. The site measuring 160x120m is roughly rectangular in layout. The site unveiled 7.75m thick deposit of habitation belonging to four distinct phases, viz. Phase I to Phase IV based on stratigraphic context, quantitative distribution of distinct and diagnostic artifacts and also by considering architectural /structural features. Phase I represents the early stage of the Mature/Urban Harappan along with Anarta pottery. Phase II demarcates the construction of a fortification. As in Phase I, this phase incorporates both Classical/Mature Harappan remains and Anarta pottery. In addition to these, isolated sherds of the Sorath Harappan pottery are also found in the upper layers of this phase. Phase III is remarkable for the predominance of Sorath Harappan pottery over the Classical Harappan and a general disorganisation of construction activities at the site. Phase IV is the Post- Mature/Urban Harappan habitation and is characterised by a group of Sorath Harappan pottery resembling Rangpur IIC and Rojdi C pottery; and by the absence of Classical/Sindh Harappan artifacts in the deposit. The material remains unearthed from the site includes objects of agate, amazonite, jasper, blood stone, carnelian, sodalite, lapis lazuli, chalcedony, chert, ernastite, flint, basalt, quartz and sand stone viz., blades, cores, grinding stones, polishers, skin rubbers, weights, beads, drill bits and copper objects namely chisels, knives, bangles, beads; shell objects such as ladle, circlets, beads, bangles, inlay pieces, balls; steatite beads, seals; faience bangles, beads; bones and bone points, scrapers, otoliths; clay objects namely sealings, balls, clay lumps with reed impressions, and varieties of terracotta objects. The terracotta objects recovered from the site during various field seasons are animal figurines, toy-cart frames and wheels with projected hubs, spindle whorls, tops, pottery, pottery rings, pottery discs, triangular cakes, bangles, beads, pendants, ear studs and inlay pieces. The site also provided evidences for shell working, stone bead manufacturing, faience making and copper working (Sonawane et. al. 2003:21-50; Bhan et. al. 2004:153-158; Patel and Rajesh 2006).

Bet Dwarka

The island of Bet Dwarka (22° 20' 00" N, 69° 05' 00" E) situated in Okhamandal taluka of Jamnagar district was first excavated by Hiranand Shastri in 1930s and dated the earliest habitation to 3rd century BC (Rao 1987). But the excavation in 2001-2002 by A.S. Gaur and Sundaresh of Marine Archaeology Centre NIO, Goa threw much light on the site and its chronology. Six trenches were laid in different parts of the island. Among them, trench BDK VI laid in the agricultural land near Balapur village indicated artifacts belong to the Late Harappan phase. Coarse red ware, buff ware and black ware sherds were found from the site. Convex sided bowls, carinated dishes, jars, stud handled bowls, miniature vessels and perforated jars were the major vessel forms. One copper fish hook and an antimony rod were also recovered from the site. Radio carbon and TL dating from the site indicate a time bracket for the Chalcolithic habitation between 1600 and 1400 BC (Gaur and Sundaresh 2003:57-66).

Bhagatrav

Bhagatrav (21° 29' N, 72° 42' E) located in Bharuch district was excavated by S.R. Rao of Archaeological Survey of India. The 2.25 m high mound revealed two cultural periods viz. Period I & II. Period I is divided into two ie. Period IA and IB. Period IA represent the Mature Harappan culture with sturdy black painted red and chocolate slipped buff pottery. The vessel types were dish on stand, dish with carinated shoulder and expanded rim, heavy jar with projected rim, basin, convex sided bowl, goblet and beaker. Besides, there were parallel sided blades of chert, disc bead of steatite, biconical beads of carnelian and faience, a terracotta humpless bull and indeterminate copper objects. Period IB revealed Late Harappan pottery and period II is Medieval (Rao 1963:1-250).

Bokhira

Excavations at Bokhira (21° 39' 20" N, 69° 36' 10"E) in Porbandar District by Marine Archaeology Centre NIO, Goa, revealed a Protohistoric settlement dating back to the mid 3rd millennium BC. Four trenches laid in the agricultural land located on the western side of the Porbandar creek revealed a habitation deposit of 50 cm. A large quantity of pottery, animal bones and other antiquities recovered from the site is akin to the material remains of Rojdi and Rangpur. One of the trenches revealed a rubble structure. The main pottery types are red ware, buff ware and grey ware. Major shapes are bowls, jars, lids, basins and pots. Paintings on the potsherds are roundels, wavy lines, cross lines and thick bands. Other antiquities from the site include stone tools, terracotta beads, clay balls, sling balls and copper ring (Gaur et. al. 2006:33-39).

Datrana

Datrana (23° 41' N, 71° 08' E) village is situated in Santalpur taluka of Banaskantha district. Three mounds, Datrana II, IV and V were excavated by the M.S. University of Baroda. Mound IV of Datrana revealed a cultural deposit varying in thickness from 75 to 90 cm and belonging to two periods: Chalcolithic and Mesolithic. The Chalcolithic period is represented by long blades, crested ridge blades, prismatic blade-cores, lithic industry debitage, beads, bead rough outs, and foliated and semi-cylindrical drill bits of chalcedony and agate. The most outstanding discovery was of a fine copper punch point, may have been used by the Chalcolithic stone knappers for producing stone blades. The pottery types associated with these finds are black and red ware, fine red ware, burnished grey ware and burnished red ware (Ajithprasad 2002:129-158). Red ware with ribbed or corrugated body and incised decorations are also common. Occasionally, sherds of the burial pottery types of Nagwada and Santhli have also been found associated with them. These artefacts are found in clusters in trenches in association with heaps of animal bones, unworked nodules, hammer stones, fragments of copper tools and other artefacts. Datrana V has a high concentration of microlithic tools, bones and pottery which showed certain features different from the Datrana IV assemblage. Datrana II is a large stabilized sand dune flanked by two inter-dunal depressions. Excavation revealed a single Chalcolithic occupation. Habitation deposit is confined to pits of different dimensions. A few of them measures a maximum of 2m diameter and 1m depth; while the smaller ones measures hardly half meter. Some of these pits were in fact pottery kilns. Pottery collected from these pits mainly represents the Sorath Harappan types. One of the pits yielded lustrous red ware bowls, dishes and the neck of a corrugated vessel typical of Post-Urban Harappan sites of Saurashtra. While another pit yielded gritty red ware and fine red ware of regional ceramic tradition. No evidence of habitation structures is unearthed from the site. On the basis of artifacts the occupation at Datrana IV seems to be earlier than Datrana II (IAR 1994-95, 1995-96).

Desalpur

Desalpur (23° 25' N, 60° 10' E) in district Kutch is located at the northwestern edge of the Little Rann of Kutch. The mound on the bank of stream Bamu Chelo covering an area of about 130x100 m rises to a height of 3 m. The three fold cultural sequence of the site is represented by Microliths, Harappan artifacts and Early Historic Rangmahal pottery. The excavations carried out by K.V. Soundara Rajan of ASI in 1964 brought to light a fortification-wall encompassing the settlement. The fort wall has a basal width of 4 m and rises to the height of 2.5 m. It appears that originally the fort was made of mud bricks with a veneer of large sized stone blocks. At intervals the fortification-wall was reinforced with bastions. The houses were made of stones or mud bricks or a combination of two. Kiln-fired bricks were very rare. The bricks were in the standard Harappan ratio of 4:2:1 measuring 50x25x12.5 cm. Within the Harappan occupation two sub periods, IA and IB were identified. Period IA was characterized by Harappan pottery shape including greenish grey reserved slip ware and period IB was noted for the appearance of grey-painted black and red ware. Other artifacts of Harappa period include: triangular terracotta cakes, animal figurines and gamesmen; beads of terracotta, faience and chalcedony; copper objects like knives, chisels, rods and rings; jasper and terracotta weights; microlithic blades, almond shaped points; saddle querns, pestles and polished celts and toy cart wheels and frames of terracotta. The most noteworthy finds are two script bearing seals, one of steatite and the other of copper and terracotta sealing with letters (IAR 1963-64; Joshi 1972:98-144).

Dhatwa

Chalcolithic mound at Dhatwa (21° 09' N, 72° 46' E) in Surat district, on the southern bank of Tapi, is locally known as Rundhi Mora. Excavation in 1968 by M.S. University of Baroda has revealed a Chalcolithic occupation over black cotton soil. The site was then occupied by iron using people of Early Historic period who used local ore, black and red ware, plain and burnished black ware, amphorae and red polished ware. The site also revealed Microliths of carnelian, jasper, chalcedony and chert. The antiquities of Chalcolithic period include terracotta objects like stoppers, animal figures, spindle whorls, discs, pellets, ear studs and beads; copper objects like kohl sticks and wire; bone points, shell bangles, hammer stones, pestles, stone balls, beads of carnelian and chalcedony, red slipped painted and plain pottery of Malwa Chalcolithic, painted black on red ware, red slipped ware and plain red ware. Pots, jars, dishes, bowls, basins and dish on stands forms the major vessel types. Animal remains recovered from the site were of fresh water bivalve, monitor lizard, crocodile, river turtle, pigeon, dog, pig, spotted deer, hog deer, blue bull, buffallo, cow, goat, mole rat and rabbit. The Chalcolithic occupation at the site ranged from 15th to the 10th century BC and the early historic from the 5th-4th century BC to 3rd-4th millennium AD (Mehta and Chowdhary 1971).

Dholavira

The Harappan site at Dholavira (23° 53' 10" N, 70° 13' 00" E), taluka Bhachau, district Kachchh in Gujarat, lies in the north-western portion of the island of Khadir. Two seasonal water tunnels Manhar and Mansar flowing on the south and north of the walled settlement. Dholavira excavated by R.S. Bisht of ASI is one among the five largest Harappan cities in the subcontinent and ruins of the site spread over an area of about 100 hectares. This city is remarkable for its exquisite planning, monumental structures and aesthetic architecture, efficient water harvesting system and variety of funerary architecture. The site has yielded an unique inscription made up of ten large-sized signs of the Indus script and fragment of a large slab engraved with three large Indus signs. Apart from huge amount of Chalcolithic pottery, chert blades, copper objects, steatite seals and beads of semiprecious stones were also unearthed from the site. There have been identified seven major cultural stages signifying the gradual rise, culmination and fall of the urban system of the Harappan civilization. The first settlement that was raised at the site in stage I was a strong fortress now lying buried in the citadel mound. In stage II, a residential area was added to the north of the walled settlement. Stage III was the most creative and important phase during which the fortress was made into a formidable castle and another walled sub division, viz. bailey, was added to it from the west. In the north, residential area of stage II was cleared of its structures for carving out a ground. Further north, an extensive walled town i.e. middle town was founded. Reservoirs were created on the south, west and north of the built up divisions. An outer fortification in order to surround all those components was also constructed during this stage. During stage III, the settlement was damaged by a natural catastrophe and repairs were undertaken and the lower town was added. Stage IV belong to the Classical Harappan phase and almost all the salient features of the city planning were maintained along with the monumental structures such as gateways, fortification, and drainage system. Stage V is characterised by the general decline, particularly in the maintenance of city, was followed by a temporary desertion of the site. The stage VI has presented a state of transformed Harappan Culture i.e. the Late Harappan phase. Domestic buildings were laid out in a different planning and after a century the Late Harappans of stage VI abandoned the settlement. The new comers of stage VII had forgotten the Classical Harappan fabrics, shapes and designs. They built their houses in circular form and no planning as such was followed. The site was never occupied once the people of stage VII left. The funerary structures which are found in a cemetery that lay to the west of the city are also remarkable for the density of structures. Excavations also brought to light the existence of large tumulis which are circular in plan and these hemispherical structures were made of mud bricks. According to excavator, the seven cultural stages of Dholavira can be dated to 3500-1700 BC (Bisht 1989a:397-408, 1989b:265-272, 1991:71-82, 1994, 1998-99:14-37, 2004:35-48).

Jokha

Jokha (21° 10' N; 73° 07' E) excavated by M.S. University of Baroda, locally known as Gabban is situated in Kamrej taluka of Surat district. The site revealed three cultural periods; Period I-Chalcolithic (1500-1000 BC), Period II-Early Historic (500BC-100AD) and Period III - Medieval. The deposit belongs to the Chalcolithic culture includes plain and painted red ware and buff ware. The Chalcolithic pottery shows affinity to Post Harappan pottery from Saurashtra, Malwa and Maharashtra. Fluted cores, lunates, blades, trapezes, points, scrapers, hammer stones, polished stone tools like chisel, copper celt and bangles were also recovered from the site. Debris of burnt pieces of walls and patches of flooring has been noted. The animal remains from the site include river turtle, dog, hyena, ass, humped cattle, buffallo, goat, sheep, spotted deer and pig (IAR 1966-67; Mehta and Chowdhary 1971).

Juni Kuran

The site of Juni Kuran (23° 27' N; 69° 47' E) located on the north eastern corner of the Pascham Beyt island in taluka Bhuj, district Kutch was reported during the course of exploration carried out by J.P. Joshi in 1968-69. The site situated 3 km north of the present day village Kuran was excavated under Shubra Pramanik of ASI. The settlement is roughly rectangular in shape and covers an area of 410x350 m with an average height of 7m. Structures made out of mud brick and stone were observed continuously from the Mature Harappan level to the Late Harappan level. The average brick size was 40-42 cm in length, 20-22 cm in breadth and 6-8 cm in thickness. Excavations at Kuran also unfolded a fortified city with gateways, middle town and two stadiums. The pottery recovered from the excavation includes reserved slip ware, cream slipped ware, grey ware, incised red ware and plain and painted red ware. Jar, dish on stand, vase, handi, dish, basin and goblet are the main vessel forms. Shell bangles and inlay pieces, terracotta objects like animal figurines, balls, hopscotch, blades of semi precious stones, copper objects like arrow heads, wire and fish hook were also recovered. Burials were also unearthed from the site (Pramanik 2003-2004:45-67).

Kanewal

Two Chalcolithic sites were excavated at Kanewal in Kheda district by the Department of Archaeology, M.S.University of Baroda. These sites are Kesari Singh's Khetar (22° 28' 00" N, 72° 30' 00" E) and Sai no Tekro (22° 27' 00" N, 72° 30' 00" E). The excavation at both the sites revealed evidences for two structures respectively having rammed floor. Wattle and daub remains suggest that the huts had walls of split bamboo or stucco plastered with clay. Red ware, buff ware, lustrous red ware, coarse, plain and incised red wares were the main ceramic types. Potsherds bearing graffiti of Harappan characters, terracotta triangular cakes, circular cakes, spherical balls, mushtikas, spindle whorls, perforated discs, toy cart wheels and pellets, copper objects, cores, scrapers, lunates, triangles, points, querns, mullers and rubber stone and beads of carnelian, chert, agate, shell, faience and terracotta were the other antiquities recovered from the site. Remains of animals like cattle, buffalo, goat, sheep, pig, camel, blue bull, ox, rhinoceros and monitor lizard were also unearthed from the site. Based on artifacts and comparative study of cultures in the region the site is dated to 2nd millennium BC (Mehta *et.al.* 1980).

Kanmer

Kanmer (23° 23' N, 70° 52' E) locally known as Babarkot is situated 35 km east of Rapar in eastern Kutch. The fortified site measuring 115x105x6 m was excavated by J.S. Kharakwal, Y.S. Rawat and T. OSada in 2006 and 2007. Six meter wide rubble fortified settlement has three entrances from west, east and southern sides. The settlement is oriented along cardinal directions and consists of two divisions. Eastern division which is higher and larger is upper town and low lying portion is lower town. No defense wall is visible in lower town. Mature Harappan pottery recovered from the site include fine red ware, coarse red ware, cream and buff slipped ware, reserved slip ware and black and red ware. Late Harappan pottery also unearthed from the site. Jars, basins, dishes, dish on stands and bowls are the common vessel forms. Chert blades, microliths, fluted cores, beads of chalcedony, agate, carnelian and shell, bangles of shell, spindle whorls and pottery discs are other antiquities (IAR 1985-86; Kharakwal *et. al.* 2005: 115-123).

Kuntasi

The ancient site, locally known as Bibi-no-Timbo (22° 50' 40" N, 70° 37' 30" E), is located in Kuntasi village of Rajkot district on the right bank of Phulki river. The site covers an area of about 2 hectares and rises to a height of 7 m. Excavations carried out by M.K. Dhavalikar of Deccan College jointly with M.R. Rawal and Y.M. Chitalwala, have revealed two main periods of occupation: I, Mature Harappan (2200-1900 BC) and II, Late Harappan (1900-1700 BC) respectively. Period I yielded pottery types like sturdy black on red ware and bichrome ware having red and buff surface with the designs painted in black and brown colours. The pottery shape include 'S'-profile jars, ledge-necked jars and stud handled bowls. Other finds of period I are terracotta toy cart frames, tubular carnelian beads, faience and steatite beads, cubical chert weights and a square faience seal. Another discovery was that of a small pot embedded in one of the rooms of a house, containing thousands of steatite micro-beads, some bangles and two rings of copper. Kuntasi was fortified and there were two successive walls, one behind the other, enclosing an area about 125 m square. The entrance, about 3 m in width was on the eastern side. Though, there was no lower town, there were a few houses outside the fortification. The houses inside the fortifications were arranged along the four sides, leaving an open area at the centre. The structures were generally made of stone rubble with mud mortar. These were also plastered with mud. In some cases, the walls were made of mud bricks with stone foundation. Period II, Late Harappan, showed signs of decadence in the area of the settlement. Some of the Harappan shapes continued in the pottery and the stud of the bowls became longer. The occurrence of the Ahar type of black and red ware was another noteworthy feature. Based on local traditions, artifact remains and location of the site, the excavators believe that Kuntasi may have functioned as a high tide esturine port. A stone anchor found on the mound also lends some credence to the port hypothesis (Dhavalikar et. al. 1996).

Lakhabawal

Lakhabawal (22° 24' N, 70° 00' E) is situated at a distance of about 22 kms to the south of Jamnagar. The archaeological mound located about 100 meters to the north of Lakhabawal village on the western bank of the rivulet called Nagamati, measures approximately 150x100 meters. The site was jointly excavated by the Department of Archaeology and Ancient History of the M.S. University of Baroda and the Department of Archaeology of the former Government of Saurashtra, under the leadership of Subbarao and P.P. Pandya during 1955-56. The excavation carried out at the site revealed a habitation deposit of three distinct cultural periods of which Period I represents Late Harappan phase associated with Rangpur IIB, Period II belongs to the Kshatrapa period associated with red polished ware while Period III is characterized by the material and structural remains of Medieval period. Pottery recovered from the site includes red and buff ware pots, jars, dishes, bowls, dish on stands and basins. Hammer stones, sling balls, shell bangle pieces, beads of chert and carnelian, terracotta animal figurines, spindle whorls and copper objects were also recovered from the site (IAR 1955-56; Rao 1963:1-250).

Loteshwar

The site, locally known as Khari no Timbo is located about half kilometer east of Loteshwar village (23° 36' N, 71° 50' E) on a sand dune close to the left bank of Khari Nadi, a tributary of Rupen. Excavation at the site by M.S. University of Baroda in 1991 revealed a habitation deposit of 1.65m belongs to two cultural periods. Of these, Period I belongs to Mesolithic culture and Period II Chalcolithic culture. The habitation deposit of Period II is very thin with hardly 10 to 20cm deposit and the excavation revealed a number of large pits of varying dimensions: 0.50m to 2m in diameter and 0.50m to 2m in depth. These pits were filled with habitation debris including pottery, animal bones and terracotta lumps all mixed with ash. Except a few clay plaster pieces with reed impressions, there is no other remains indicating structural features. Ceramic assemblage in Loteshwar consists of regional pottery of north Gujarat i.e. gritty red ware, fine red ware, burnished red ware and burnished grey ware along with black-and-red ware, coarse red ware, coarse grey ware, reserved slip ware and some sherds of Harappan red ware. Steatite micro beads, microlithic tools and crudely made shell bangles and beads are also found in the deposit. Bone bead, querns, rubber stones, copper object, mushtikas, terracotta pellets, animal figurine and circular terracotta cake were also unearthed from the site. Radiocarbon dates suggest that the regional pottery at Loteshwar had a very early origin dating back to fourth millennium BC (IAR 1991-92; Sonawane and Ajithprasad 1994:37-49; Bhan 1994:71-90).

Lothal

Lothal (22° 31' N, 72° 15' E) is situated in Saragwala village, Dholka taluka of Ahmedabad district. The archaeological mound stands to a height of about 5.5 m above the surrounding plains and the excavations have revealed that occupational strata go down by another 3 m. The excavations at Lothal were carried out by S.R. Rao of ASI between 1955 and 1962. He has divided the total occupation at the site into two main Periods i.e. A and B. These periods are further divided into phases: Phases I-IV falling in Period A and Phase V in Period B. Phase I represent the beginning of the site when two distinctive ceramics, viz. micaceous red and black and red wares were in use.

During Phase I, the Harappans begin to appear on the scene, but it was in Phase II that they laid out their township. In the case of Lothal, citadel part lay within the overall area enclosed by the town-wall and there is no separate wall around the same. However, the citadel maintained the identity due to its location on a high mud brick platform and also special structures thereon. Forming a rectangle on plan, the town covered an area measuring approximately 280 m north south and 225 m east west. It was surrounded by a wall made of mud, at places reinforced with mud bricks but rarely with kiln fired bricks. An entrance to the township was also discovered about the middle of the southern wall. Oriented along the cardinal directions, the houses lay in blocks which were separated one from the other by means of streets and lanes. The widest street measures 12 m across, while the narrowest one 3.6m. Running along some of the streets, there were underground drains constructed with kiln fired bricks. Phase III appears to have been the most prosperous one. Some of the houses during this phase were larger than those in other phases. These consisted of four to six rooms, spacious courtyard and verandahs. Baths were paved with kiln fired bricks. Some of the houses have yielded remains of fire-altars and evidences of craft activities in the form of crucibles and raw materials. The excavator identified one of the streets as the Bazar Street, having shops on both sides. To the east of the township there is a trapezoidal basin enclosed by walls of kiln fired bricks. The western and eastern walls of this basin measure respectively 215 m and 212 m in length, those on the north and south measure respectively 37 m and 35 m. In these walls two inlets for entry of water was noticed; one on the northern side and the other on the eastern, measuring respectively 12 m and 7 m in width. According to the excavator the basin functioned as a dockyard. To the west of the town, between the peripheral wall and the river, lay the cemetery. Most of the burials were in the usual Harappan style and three contained two skeletons each. The lower town provided accommodation for craftsmen-coppersmiths, goldsmiths, shell workers and bead makers and their shops and working places are marked by the remains of craft.

According to Rao, in Phase IV which followed a flood, the dock had to be rebuilt with walls of reduced thickness and due to the choking up of the original flow channel a new and narrower channel of the river had to be excavated. The final destruction of the dock took place with a flood that ended the prosperity of the settlement. In Phase V, there were no town planning; they had jerry built houses with mud floors, reed walls and thatched roofs. The long Rohri chert blades gave place to shorter blades of locally available stones and ceramics also underwent changes. Seals, sealings, weights, terracottas, copper/bronze and gold objects and varieties of beads were recovered from the site. In addition to the micaceous red ware and black and red ware vessels, Harappan forms like perforated jar, goblet, beaker, small necked jar, large jar with 'S' profile usually red but some times buffish –are in evidence at Lothal. A local type was the convex sided bowl with or without stem. The excavator's date for the mature Harappa culture, Period I, of Lothal is from 2450 to 1900 BC., and for the decadent phase, Period II 1900 to 1600 BC (Rao 1979, 1985).

Malwan

Malwan (21° 06' N, 72° 43' E) is a Chalcolithic settlement unearthed in Surat district. It is on the lower estuary of Tapi river, east of Dumas. Allchin and Joshi discovered the site in 1967. Excavation was jointly conducted in 1970 by Archaeological Survey of India and Cyrus Guzder of the University of Cambridge. Two periods of cultural activities met within a deposit of 1.3 m in an area of 15X30 m. Period I represent Late Harappan to Post Harappan Chalcolithic occupation and Period II consisted of a group of historical pits and hearths of temporary occupation. The structural remains of Period I is a ditch in an east west direction and has been traced to a length of 18.30 m. It has an average depth of 1.10 m and width 1.50 m cut into the natural soil. The soil from its original excavation was spread on both sides and particularly the northern side was banked up to form the base of a substantial mud brick structure. The original form of structure is not clear. Its maximum width is 3 meter and six to seven courses of mud bricks survive at places. To the south of the ditch a number of post holes at intervals of 2.8 m were dug to provide some sort of fence. The site also produced quantities of shell, both fresh water and marine, blade cores, flakes and potsherds at varying depths. Small humped bulls, a number of circular terracotta cakes and a small number of beads of faience and carnelian were also been unearthed (Rao 1963:1-250).

Mathutra

Mathutra (23° 44' N, 72° 05' E) in Santalpur taluka of Banaskantha district was excavated by Abhijit Majumdar of M.S. University of Baroda in 1995. The excavation at the site, locally known as Madhvya no Timbo yielded Pre-Harappan burial pottery. The pottery types include red ware and buff ware. Bulbous pots, dish without carination and shallow bowls were the major shapes. No structural remains were unearthed from the site (Majumdar 1999).

Megham

Megham (21° 42' N, 72° 45'E) in district Bharuch on the estuary of Narmada is an eroded Late Harappan site excavated in 1957 by S.R. Rao of ASI. A small burial pit in the site revealed two high necked jars, a dish on stand and a flat dish. Besides these ceramics, jar with raised neck painted in black over red, dish with beaded rim, dish on stand and bowl, a carnelian bead and a terracotta biconical bead were also excavated. Microliths equitable to those of Rangpur I was also found (Rao 1963:1-250).

Motipipli

The site of Moti Pipli (23° 49' N, 71° 32' E) on the mound locally known as Shakhatri Timbo located about 3km west of Moti Pipli village in Radhanpur taluka was excavated by M.S. University of Baroda. The site is situated on a large stabilized sand dune adjacent to a large inter-dunal depression. The excavation revealed a regular habitation deposit of 90cm belonging to the Mesolithic, Harappan affiliated Chalcolithic and Historic periods. The Chalcolithic phase has a maximum deposit of 50cms. Ceramics collected from this phase include Anarta pottery types along with black-and-red ware and reserved slip ware. Another group of pottery is a type of fine red ware and buff ware which are found to be similar in shape and fabric to the pottery from the burials excavated at Nagwada. Major shapes in this are large pots, dishes, dish-on-stand, beakers, large beaker shaped vases with narrow mouth and bulbous body. Harappan pottery sherds are very few in the assemblage. Other antiquities found from this period are copper/bronze nail and fish hook, chert/flint long blades, beads of chalcedony, steatite, lapis lazuli, shell, faience and biconical and spherical terracotta beads, pellets, mushtikas and two pinched and four pinched lumps. Faunal remains collected from the site are bone, teeth and horn of cattle, sheep, goat, deer and pig (IAR 1992-93; Majumdar and Sonawane 1996-1997:11-17).

Nageshwar

Nageshwar village (22° 20' N, 69° 03' E) is located at a distance of 17 km northeast from Dwaraka, between Pindara and Poshitra bays on the southern coast of Gulf of Kutch in Okhamandal taluka of Jamnagar district. The excavation was carried out in 1984 by M.S. University of Baroda. The Harappan site is located on the north eastern edge of Bhimgaja Talav. The Chalcolithic mound measuring 145x100x2 m was destroyed by the local earth work contractors. The destructed mound brought to light 2.5 m thick deposit of Harappan culture debris. Many sections of the pits revealed remains of rubble structures. Among the Harappan pottery, reserved slip ware, fine grey ware, buff ware, sturdy red ware and coarse red ware were present. Some of the red ware sherds were decorated with geometric, floral and faunal patterns in black pigment. Thousands of large and small shell fragments spread out all over the site. A number of complete circlets, broken pieces of ladles and circlets, querns, mullers, weight, cylindrical stones, hammer stones, whetstones, terracotta discs, spindle whorls, wheels, pellets, toy cart frames, potter's dabber, triangular cakes, beads, copper sheet and fish hook were also recovered from the site. The bone remains from the site include those of cattle, buffalo, sheep, goat, pig, dog, blue bull, black buck, hare and turtle (Bhan and Kenoyer 1984:115-120; Hegde et. al. 1990).

Nagwada

Nagwada (23°49' N, 71°32' E) is a Mature Harappan site excavated by M.S. University of Baroda in Dasada taluka of Surendranagar district. The 1.5 hectare site, known as Godh, is located about 3km south of Nagwada village on a relic sand dune. A stream called Vankali flows near the mound. One meter thick habitation deposit revealed five distinct layers incorporating four structural levels of single period having two distinct phases: IA and IB. Period IA is represented by few burials, both inhumation and symbolic, which were found in the early levels of the deposit, whereas, Period IB is represented by entire upper layers of a single culture habitation. The pottery associated with the burials has affinity with the pre-Harappan pottery found from Amri, Kot-Diji and Nal. Post holes that went down into the natural soil in the fifth layer marked the first phase of structural activity at the site. In the second phase rectangular structures built of undressed stones were observed. In the third phase there were rectangular structures built of molded mud bricks measuring 32x16x8cms. In the fourth phase rectangular structures were built of rubble stones. The site has yielded Harappan artifacts including an inscribed terracotta sealing, agate weights, etched carnelian beads, flint blades, shell objects, beads of gold and semi precious stones, copper celts and a variety of terracotta objects including a female figurine. The classical Harappan pottery with characteristic shapes and paintings are rare in this level. The ceramic assemblage is dominated by a series of non-Harappan pottery types peculiar to north Gujarat region. Four important types identified in the non-Harappan pottery are gritty red ware, fine red ware, burnished red ware and burnished grey ware. Forms encountered were dish-on-stands, stud handled bowls, bowls without handles, basins, dishes, lids and large and medium size storage jars. Besides, sherds of white painted black-and red ware, coarse grey ware and chocolate slipped ware were also encountered. The excavation also brought to light interesting features of specialized craft activities like shell working and stone bead making. Radiocarbon date for the upper levels of period IB is 2180±80 BC (IAR 1985-86, 87-88, 88-89; Hegde et. al. 1988:55-65; Sonawane and Ajithprasad 1994:37-49).

Nesdi/Valabhi

Nesdi/Valabhi (21°48' N, 71°58' E) is situated on the bank of Ghelo river in Vallabhipur taluka of Bhavanagar district. The site was excavated during 1980 by M.S. University of Baroda. The mound is 50 cm in height and it covers an area of 200x200 meters. The excavations at the site revealed two rammed earth floors. One of them was in a better state of preservation and it revealed the presence of a circular superstructure. The excavation also indicated the presence of red ware, buff ware, black and red ware, crude red ware, scrapers of basalt, terracotta bulls, potsherds bearing graffiti, spindle whorls, pottery discs, toy cart wheels, shell bangles, beads of shell, steatite, faience and carnelian, grinding stones, hammer stones and copper sheet. The osteological remains indicated the presence of cow and deer (Mehta 1984:243-251).

Oriyo Timbo

Gujarat State Department of Archaeology and University of Pennsylvannia conducted excavation at

Oriyo Timbo (21° 54' N, 71° 32' E) near Chiroda village of Gadhada taluka in Bhavanager district. Excavations in the 175x250m mound in 1981-82 revealed two period occupation with a settlement of microliths using inhabitants preceding a pastoral camp of lustrous red ware using community. A broken terracotta bead/ pendant with incised geometric design was found associated with pottery shapes like pots, jars, bowls and basins. The site also revealed deep storage pits, chuhlas and hearths. Remains of got, sheep, gazelle, antelope, blue bull and rhinoceros were also recovered from the site (Rissman 1985; Rissman and Chitalwala 1990; Reddy 1991:79-81).

Pabumath

Pabumath (23° 37' N, 70° 31' E) lies 2 km south west of the village Jesda, Rapar taluka in Kutch district was excavated by State Department of Archaeology, Gujarat. The eastern periphery of the 5 meter high mound was damaged due to the digging of a canal connected with Suvai dam project for irrigation purpose. The ceramics consist of Harappan red ware, buff ware, black and red ware and reserved slip ware. The Harappan types in red ware are represented by jar, perforated jar, thick dish and convex sided bowls. Buff ware is represented by convex sided bowls. Black and red ware bowls with convex profile are also available. Ceramic shapes are comparable with Rangpur IIA & IIB. Three varieties of reserved slip ware were found: painted in black over dark grey slipped surface, painted in red over a light red surface and painted in chocolate over light grey surface. Sherds of coarse black painted red ware, akin to the Rangmahal pottery and red slipped cream ware of Early Historic period were also met with. The site also yielded Harappan antiquities like parallel sided chert blades along with flakes and small blades of chalcedony. (Joshi 1972:98-144).

Padri

Kerala no Dhoro (21° 20' 21" N, 72° 06' 32" E), located in Padri Gohilini village, Talaja taluka of Bhavnagar district excavated by Deccan college, Pune revealed three-fold cultural sequence i.e. the Pre Harappan Padri culture, Mature Harappan and Early Historic. There is C14 date available for the uppermost levels of the Mature Harappan phase which goes back to 2300 BC. It is therefore possible to assume the date of 2500 BC as time for the beginning of this period. The C14 dates for the Pre-Harappan phase at Padri goes back to fourth millennium BC (3636 BC). Padri ware, pink slipped painted ware, white lustrous ware, bichrome ware, red painted ware and white painted ware were the ceramic types recovered from the site. Terracotta discs, spindle whorls, shell bangles and beads, beads of semiprecious stones, copper fish hook and grinding stones were also unearthed. The Early Historic period (1st century BC-AD) is represented by red polished ware, clay tablet bearing the Brahmi script, Kshatrap copper coin, tortoise shaped copper lamp, boat shaped terracotta objects and moulded terracotta human figurine ((Shinde 1992a:79-86, 1992b:55-66; Shinde and Kar 1992:105-110; Shinde and Thomas 1993:145-147).

Pithad/Jaidak

Pithad (22° 41' N, 70° 35' E) in Jodiya taluka of Jamnagar district is located about 40 km northeast of Rajkot and about 30 km south of Gulf of Kutch. The Chalcolithic site is about 4.5 km southeast of the village on the right bank of Aji river. The site locally known by the name Jaidak/Jaidak no Timbo was first reported by S.R. Rao in 1963. In 1992, M.S. University of Baroda carried out a small scale excavation at the eastern extension of the site i.e. Jaidak-2. The 1992 excavation revealed one meter thick Mesolithic substratum prior to the Late Harappan occupation. The Chalcolithic settlement at Pithad/Jaidak shows distinct features of the Harappan planning and layout with a citadel, a lower town and an open court; all enclosed with an extensive fortification wall. No Urban Harappan artifacts were found from the site. The ceramic assemblage recovered from the site indicated Sorath Harappan features dated to 1900 to 1700 BC. During 2005-2007, Jaidak-1 was excavated by M.S. University of Baroda. Architectural elements unearthed from the site include fortification wall and residential structures. Other material remains obtained from the site are various kinds of pottery datable to Rangpur II B and IIC, potsherds with graffiti, spindle whorls, pottery discs, spacers, ear studs, terracotta beads, animal figurine, beads of carnelian, chert, steatite, faience, amazonite and shell, shell bangle and bangles and rings of copper (IAR 1992-93; Ajithprasad 2003).

Rangpur

In 1935 M.S. Vats conducted the trial excavations at Rangpur (22° 26' N, 71° 55' E) situated on the banks of river Bhadar in Surendranagar district and declared it as a site of the Late Harappan period. Later on Ghurye (1939) endorsed this view. However Dikshit (1950) after his excavation in 1947 felt that the remains were of the formative stage of post-Harappan culture. A large scale excavation was undertaken by S.R. Rao of ASI during 1953 to 1956 and he classified the occupational deposit into four periods with three sub periods in the Harappan culture. The sequential dating given by him are as follows; Period I: Microlithic stage unassociated with pottery, 3000 BC, Period II A: Harappan 2000-1500 BC, Period IIB: Late Harappan, 1500-1100 BC, Period IIC: transition phase of the Harappan, 1100-1000 BC, and Period III: Lustrous Red Ware culture, 1000-800 BC. In period II A, the Harappan occupation is seen in the north western part of the mound, with four structural phases. The houses are built on solid mud brick platforms and the floors are paved with mud brick. Drains of kiln burnt brick are attached to baths. Sturdy red and buff, coarse red and grey wares constitute the main ceramics with micaceous red and black and red ware in less number. Dish on stand, perforated jar, 'S' shaped vessel, goblet and beaker forms major shapes. Copper celts and pins, cubical agate weights, shell bangles, copper bangles and rings, steatite ornament of floral design, a hoard of 4900 tubular microbeads of steatite in a jar, beads of carnelian, agate, faience and gold comprises the other antiquities. The occupation of the period was destroyed by floods. In period II B the occupation was in the centre and eastern parts of the mound. The structures were possibly of mud and have left no traces. The pottery is of coarse fabric. Red ware predominates but the buff and micaceous red ware is found in limited quantities. During period II C the people looked for better amenities and attempted to revive the tradition of painting pots. The designs are simple linear and burnishing of the pots over a thick red slip give them a lustrous effect. The ornaments are in locally available materials like jasper and agate. Houses of Period III are made of mud brick and show two phases with lime and mud as binding material and clay rammed in the foundation. In ceramics the lustrous red ware and black and red ware continue and coarse red ware is found in substantial quantity. The vessels are of small size with thin walls and the main types are the deep bowl with concave-convex profile and carinated shoulder, often with ring footed base, short stemmed bowl, dish with fully beaded rim and high necked jar with ovoid body. Terracotta animal figures include bull, dog and pig. Jasper and agate were the material for lithic implements and beads. The animal remains are mainly of cattle, sheep, goat and ass and the charred grains indicate use of bajra and jowar (Rao 1963:1-250).

Ratanpura

Ratanpura (23° 28' N, 71° 48' E), a Late Harappan settlement of Rupen estuary situated 5km south of Shankeshwar in Sami taluka of Mehsana district was excavated by M.S. University of Baroda. The site known as Tokariyo Timbo lies about one kilometer south of Ratanpura village, on the edge of an inter-dunal depression, near the crest of a relic sand-dune. The archaeological remains are spread out covering an area of about 500x250m with four distinct localities belonging to two cultural periods. Of these four localities, I and II are rich in late Harappan debris, III was heavily littered with bone fragments and microliths and IV, located on the river bank, was marked by a number of circular ashy pits and numerous terracotta lumps. Excavations were conducted at all the mounds. The excavation in Mound II revealed 85-95cm thick deposit of a single cultural phase, comparable with those of Rangpur IIC. Pottery recovered in the excavations were Harappan plain and painted sturdy red ware and buff ware, Late Harappan lustrous red ware, white painted and plain black and red ware and coarse grey and red wares. A number of rammed earth floors of circular huts with 'U'-shaped chullah of mud built on the floor were unearthed. There were a number of pestle stones, saddle querns and beads of steatite, faience, shell, carnelian and terracotta. Mound III yielded a large quantity of bone fragments together with Mesolithic tools such as fluted cores and flakes of chert and chalcedony. The trench did not yield any pottery. Excavation on mound IV brought to light three circular pits with an earthen lamp and a post-hole at the bottom and filled with ash, charcoal, charred and uncharred bone pieces, fragments of three varieties of terracotta sealings and hundreds of terracotta lumps of many shapes. These pits appear like ceremonial structures. The most important finds of this excavation are stamped clay lumps bearing intricate circular geometric pattern (IAR 1984-85; Sonawane 1994-95:37-49).

Rojdi

Rojdi (21° 52' N, 70° 55' E) on the bank of river Bhadar measures about 500 m in length and 150 m in width. Though many archaeologists like P.P. Pandya, M.A. Dhaky and C.M. Atri had contributed to the exploration and excavation of Rojdi, the works from 1982 to 1986 and again from 1992 to 1995, by a joint team of the Department of Archaeology, Government of Gujarat and the University of Pennsylvania, USA, under the direction of Gregory L. Possehl threw much light on the site and its chronology. On the basis of pottery and other finds, the occupational strata of the site have been grouped into three periods which, have been labelled as Rojdi A, Rojdi B and Rojdi C. The three periods are assignable as: Rojdi C: 2000-1700 BC, Rojdi B: 2200-2000 BC and Rojdi A: 2500-2200 BC. The site stands as a regional variation of Harappan culture. The town planning does not follow the Harappan criss-cross pattern and the pottery painting style is different. The subsistence pattern is also different from the Classical Harappan wherein wheat and barley played the major role. At Rojdi there is dominance of millets such as bajara, jowar and ragi. The animal remains from the site included zebu, water-buffalo, goat, sheep, pig, cat, chicken, black buck, blue bull and elephant. Antiquities of copper, terracotta and stone were also unearthed from the site. The houses were made of mud walls on stone foundations and within the houses have been noted hearths and bases of storage jars. The use of kiln fired bricks was very rare and was also no system of drainage. There is also evidence of 2 m thick fortification wall, made of large sized stone boulders, and of a gateway associated with it. Some members of the community were literate, as indicated by the presence of one inscribed potsherd. The habitation was enclosed in a double massive defense wall built of huge boulders. Some of the square structures have storage facilities (Possehl and Rawal 1989).

Santhli

The Chalcolithic site on a large stabilized sand dune, locally known as Gachi no Thumdo (23° 41' N, 71° 29' E), is located about one and half kilometer southwest of Santhli village in Radhanpur taluka of Banaskantha district. Excavation at the site by M.S. University of Baroda revealed a total habitation deposit of 40cm belonging to two distinctive cultural periods i.e. Period I: Mesolithic and Period II: Chalcolithic. The Period II at the site is represented by 10 to 15cm deposit of Chalcolithic habitation directly overlying the Mesolithic. The Chalcolithic deposit includes sherds of pottery, stone and shell beads and shell bangles. The deposit also incorporated two extended inhumation burials. One of them was an extended joint/double burial of two adults interred in same pit. The bodies are rested on their back with head tilted in an awkward position facing each other. The second burial was of a small child. Along with these burials are also found few vessels of different shapes. All these vessels are similar to the pottery found from the burials at Nagwada showing pre-Harappan affinity (IAR 1993-94).

Shikarpur

Shikarpur (23° 07' N, 70° 35' E) locally known as Valamiyo Timbo is a Harappan site which lies 5 km southwest of the present village, in Bhachau taluka, district Kutch. The ancient site at Shikarpur was excavated during 1987-1990 by Gujarat State Department of Archaeology under M.H. Raval. The excavation revealed Harappan cultural materials in a deposit of over 3 m thickness. According to the excavators, layers 1 to 9 are Mature Harappan and layers 10 to 19 are Early Harappan. In addition to various Harappan pottery types, terracotta bulls, rams, toy carts, bangles and triangular cakes; shell beads and bangles; semi precious stone objects like pendants and beads, copper objects like rings, bangles and chisels; chert blades; dentalium shells and bone objects were also found. The faunal remains from the site are of cattle, buffalo, sheep, goat, pig, dog, buffalo, blue bull, blackbuck, jackal, hare and rhinoceros (IAR 1963-64; Thomas et. al. 1995:34-41).

Somnath/Prabhas Patan

Somnath/Prabhas Patan (20° 53' N, 70° 24' E) situated on the bank of river Hiranya in Junagadh district has been excavated twice, first in 1956-57 by Gujarat State Department of Archaeology and M.S. University of Baroda and later in 1970s by Deccan College Pune and Gujarat State Department of Archaeology. The five cultural periods identified in the site are: Period I (3000 - 2800 BC- Pre- Prabhas), Period II (2200 - 1700 BC - Prabhas), Period III (1700 - 1400 BC - Late Prabhas), Period IV (4th cent. BC - 1st cent. AD - Early Historic I), and Period V (1st cent AD - 6th cent AD - Early Historic II). The Pre-Prabhas culture was characterized by ceramic types like red ware, incised red ware, black and red ware and grey ware. The vessel shapes include wide mouthed jars, dishes, basins and handi (Dhavalikar and Possehl 1992). Prabhas culture was represented by painted black on red or violet on gray beveled rim bowls, plain gray beveled rim bowls and painted black and red beveled rim bowls. Lustrous red pottery represented the Late Prabhas culture. Period V yielded red polished ware associated with fine molded terracotta animal and human figurines, carved shell bangles and few sherds of amphorae. Other antiquities from the Chalcolithic levels of the site are chalcedony blades, beads of faience, steatite, chert and terracotta and fragments of wall plaster with reed impression, shell bangles, copper celts and grinding stones (IAR 1955-56, 1956-57, 1971-72, 1975-76, 1976-77; Nanavati.etal.1971).

Surkotada

Surkotada (23° 37' N, 70° 50' E) is situated at a distance of about 160 km northeast of Bhuj. The excavations over Surkotada by JP Joshi of ASI have brought to light a continuous occupation of the site, divided into three sub-periods i.e. IA, IB and IC. The finds from sub-period IA include steatite seal, beads and long blades of chert and some polychrome non-Harappan pottery. Subperiod IB is distinguished from

IA on the basis of the occurrence of coarse red ware, sometimes painted and incised. Noteworthy among the finds were a flat copper celt and a chisel. The end of sub period IB is marked by the occurrence of a thick layer of ash, suggestive of a conflagration. Period IC revealed stud-handled bowls and inscribed seal. The layout of the settlement at Surkotada consists of two juxtaposed and fortified parts, each a square and having almost the same dimensions. The orientation is roughly along the cardinal directions, the combined longer axis being east west. Of the two parts, that on the west has been designated by Joshi as Residential Area. The main difference between the two parts seems to be that the houses in the citadel were built over a platform of rammed earth and were bigger than those in the Residential Area, which had no underlying platform. The southern fortification wall has two gateways, one leading into the citadel and the other into the Residential Area. Another gate, smaller in size, pierced the intermediary wall, providing intercommunication between the two parts. The core of the fortification in Subperiod IA was essentially of mud and mud bricks, having an average width of about 7 m. Though not to the full height, a veneer of stone rubble was provided to it. There is also evidence of mud plastering. In subperiod IC, the fortification wall around the citadel as well as the residential area was reconstructed in stone and the width was reduced to 3.5 to 4 m. There were two other noteworthy features, viz. the provision of a rectangular barbican with a ramp, steps and guard rooms in front of the southern gate of the citadel and the addition of rectangular bastions at the corners. A cemetery located to the south west of the fortified area dating back to subperiod IA brought to light a pot-burial with cairn and capstone. According to excavator another noteworthy point about Surkotada is the occurrence of a few bones of the horse. Bangles of terracotta and shell, beads of steatite, faience, semiprecious stones and terracotta, copper objects, terracotta triangular cakes, animal figurines, toy cart frames and wheels, and chert blades were also recovered from the site (Joshi 1972:98-144, 1990).

Vagad

Vagad (22° 19' N, 71° 52' E), is a small village situated on the right bank of Bhadar river in Dhandhuka taluka of Ahmedabad district. The archaeological mound locally known as Kedio Timbo excavated by M.S. University of Baroda covers an area of 450 m north south and 300 m east west and rises to a height of 2 m from the surrounding plain. The single period site is divided into three sub periods viz. Period IA, IB and IC mainly on the basis of successive superimposed three structural levels. Six circular hut remains were unearthed in the excavation. Sturdy red ware, buff ware, chocolate slipped ware, micaceous red ware, crude red ware, crude grey ware and white painted black and red ware are the main pottery types from the site. Jars, bowls, dishes, goblets, basins, pots and dish on stands were the major shapes recovered from the site. Other finds of this excavation are the discovery of yajna vedikas, terracotta and stone weights, storage jars buried underneath circular floors, pulley shaped terracotta ear ornaments, partially ground broken stone celt, pot-sherds having graffiti, beads of various materials, shell bangles with chevron motif, spindle whorls, toy cart wheels, discs, crucibles and copper objects, saddle querns, pestles, rubber stones and sling balls. Faunal remains from the site include bones of the animals like cow, buffalo, goat, sheep, dog, spotted deer, gazelle, black buck, blue bull, pig and rat. Radio Carbon dates of Vagad IA is 2190-2080 BC, IB is 1800-1600 BC and Vagad I C must be later in date (Sonawane and Mehta 1985:38-44).

Valabhipur

Valabhipur (21° 41' 15" N, 71° 38' 31" E) in Bhavnagar district was the first excavated Chalcolithic site in Gujarat and it was done by H. Heras of Bombay. The antiquities recovered from the site include

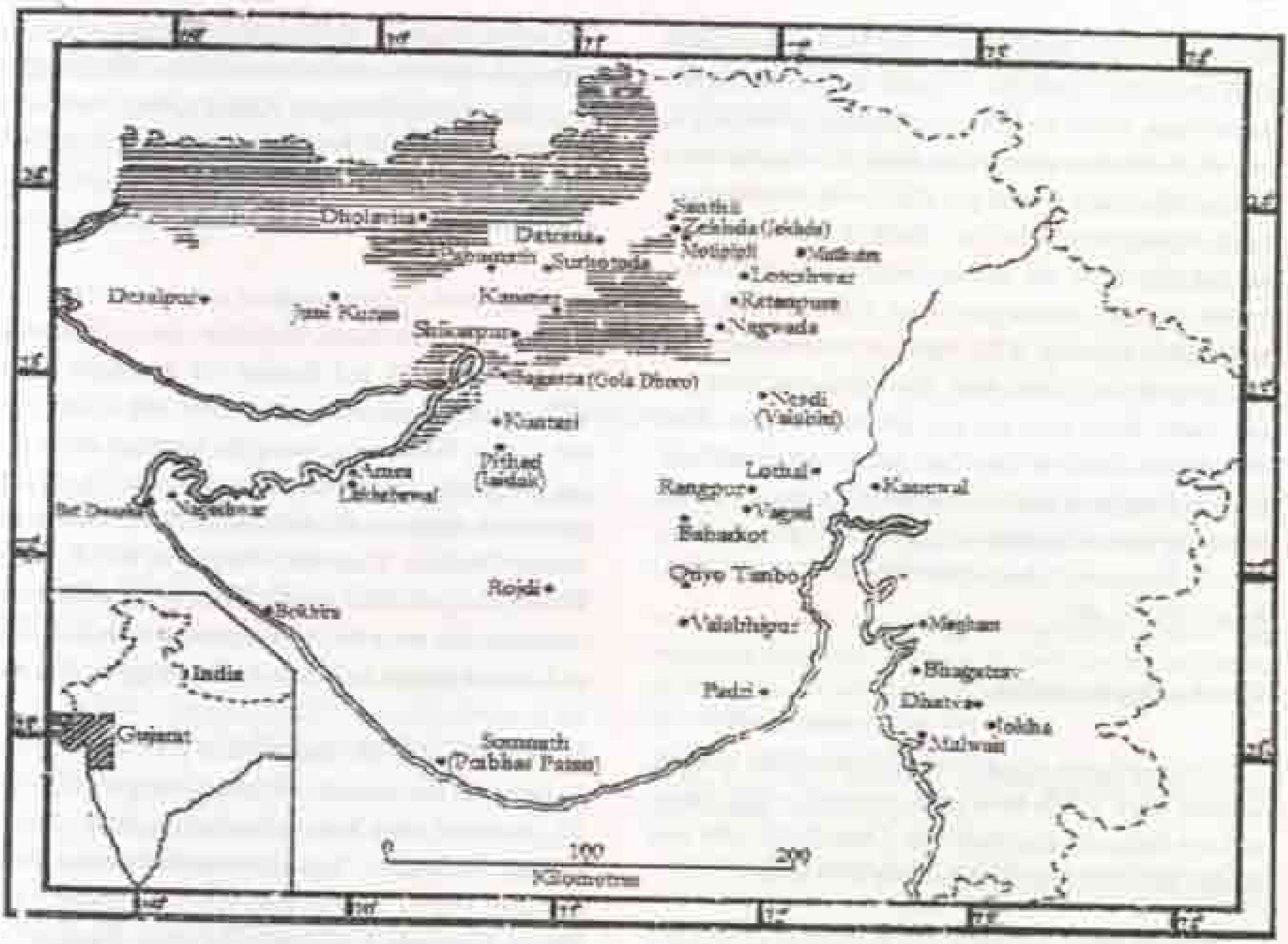

Fig. 1: Map showing Excavated Chalcolithic Sites in Gujarat

Harappan pottery types like red ware and buff ware. Pots, jars, bowls and dish on stands were the major shapes and they are comparable to those of Rangpur IIB and IIC. Worked potsherds like spindle whorls, pottery discs, beads of terracotta, steatite, faience and semiprecious stones and lithic tools were the other antiquities recovered from the site (Anderson and Afonso 1990)

Zekhda/Jekhda

The site of Zekhda (23° 40' N, 71° 20' E), locally known as Amasari no Tekro excavated by M.S. University of Baroda is situated in Santalpur taluka of Banaskantha district. The Chalcolithic habitation debris at the site covers an area of 9 hectors. There is a slight depression in between the western and eastern parts of the mound and the eastern part is named as Mound I and the western as Mound II. Habitation debris is found to be concentrated at four discrete clusters. Locality I and II are on Mound I and II respectively and locality III and IV are found on the northern and western side of locality II. Excavations were carried out on all four localities. Excavations in these localities revealed a habitation deposit varying in thickness from 30cm to 1.25m. Trenches in locality II exposed a cluster of circular huts at different levels starting from the lowest layer. About 11 circular huts, some of them with rectangular or oblong passage on one side and post holes were unearthed. The size of these circular structures varied from 2.60m to 3.60m in diameter. In locality I, one of the trenches revealed remains of a circular hut's rammed floor and a small pot filled with steatite micro beads resting on this floor at a depth of 80cm. Ceramic assemblage from the site includes gritty red ware, coarse red ware, coarse grey ware, black and red ware and lustrous red ware. A few sherds of reserved slip ware and polychrome wares were also unearthed from the site. Other finds from the site are long parallel sided chert blades, beads of carnelian, jasper, lapis lazuli and faience, bangles of shell and terracotta, wires of copper, triangular and rectangular terracotta cakes, lumps, balls, toy cart frames and wheels (IAR 1977-78; Momin 1983; Bhan 1994:71-90).

Concluding Remarks

The highlights of excavated Chalcolithic sites in Gujarat since 1930s have been covered in this article and our understanding about the Chalcolithic sites and studies till 2007 can be summarize as follows:

Among more than 750 sites reported in various geological zones of Gujarat, only 39 were excavated and 7 are located in Kutch, 19 in Saurashtra, 8 in north Gujarat and 5 in south Gujarat. Valabhipur, Rangpur and Bet Dwarka respectively are the three sites excavated prior to independence. Excavations at diverse sites were conducted by different departments independently or jointly. The major institutes contributed to the excavations are The Maharaja Sayajirao University of Baroda (19); Archaeological Survey of India (9); State Department of Archaeology, Gujarat (8); Deccan College, Pune (3); University of Pennsylvania (3); National Institute of Oceanography, Goa (2); Indological Studies, Bombay (1); University of Cambridge (1); Department of Archaeology, Government of Saurashtra (1) and Rajasthan Vidya Peeth, Udaipur (1).

Different periods of Chalcolithic history of Gujarat was represented by cultures and traditions like Classical Harappan, Sorath Harappan, Anarta pottery, Padri ware, Pre-Prabhas ware, Pre Harappan Burial pottery, Micaceous Red ware, Prabhas ware, Lustrous Red ware and Malwa ware and ceramics denote each tradition.

Chalcolithic Archaeological research in Gujarat is not free from draw backs. Only four sites i.e. Dholavira, Lothal, Surkotada and Kuntasi are protected for the visitors and site museums are present only in Dholavira and Lothal. While considering the literature about each site, complete excavation reports of just 11 sites are published; they are Kuntasi, Nageshwar, Surkotada, Jokha, Dhatwa, Kanewal, Somnath, Rojdi, Oriyo Timbo, Rangpur and Lothal and rest of the publications related to sites are in the form of some articles in journals and annual reports in Indian Archaeology- A Review.

There is also the limitation of poor chronological control over the remains of Chalcolithic period. Merely 15 excavated sites have radio carbon dates; they are Lothal, Surkotada, Rojdi, Somnath/Prabhas Patan, Kuntasi, Padri, Vagad, Ratanpura, Malwan, Oriyo Timbo, Nagwada, Loteshwar, Babarkot, Bagasra/Gola Dhoro and Pithad/Jaidak. Other sites are dated based on relative chronology i.e. Rangpur and Rojdi sequences. Earliest c14 date of 3698 BC was given by Loteshwar while Malwan provided a late c14 date of 800 BC. On the basis of radio carbon dates and relative chronology, Chalcolithic period of Gujarat is broadly dated between 3500-1000 BC.

Though the excavated sites revealed material evidences in various degrees for the existence of craft specialists, artisans, transport workers and merchants; religion and ritual; controlling authority; monumental architecture; science; writing and script; art; foreign, internal and intra-site relation; social stratification; domestic and wild fauna and flora; there are many questions pertaining to Chalcolithic social, political, religious, economic and subsistence systems and language and script still remain unanswered. Probably the use of modern archaeological techniques of excavation combined with technical and contextual analyses and critically evaluated and interpreted results should enable us to gain better understanding of Chalcolithic cultures of Gujarat.

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Early Village Farming Settlements in Eastern India: An Appraisal

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Preliminaries

Discovery of the formative phase of development of Early Village Farming (EVF hereinafter) settlements in Eastern India is generally characterized by the use of a long-lasting pottery type named the Black-and-Red Ware (BRW hereinafter). Excavation of this ceramic type from sites like Chirand in north Bihar and Pandurajardhibi in West Bengal in the early sixties of the twentieth century created new research interests in the history and archaeology of Eastern India in general and West Bengal in particular (Chakrabarti 2001, 2006, Chattopadhyay and Sanyal 2006: 1386). This genre of research has consistently and increasingly emphasized the hiatus between the pre-ceramic Late Stone Age hunter-gatherer/Mesolithic-'Mesolithic Survivor' stage and the beginning of the historical period in c. sixth century BC.

One of the major areas of research in the recent years has been centred round studies on EVF culture based on the agro-pastoral economy of the Protohistoric periods (roughly datable to the middle of the second and the first millennia BC). Consequently, there has been a plethora of writings with exclusive highlights on terminologies such as 'Chalcolithic', 'Protohistoric', 'Early Farming' and even 'Osteochalcolithic' cultures (Sinha 2002: 322-55). Such studies, based on excavated and explored database of Central India, Deccan and Eastern India, are often characterized by "regional" developments in history involving various interpretative and theoretical models on origin, chronology, migration and expansion of early Indian village culture.

Different scholars working on South Asian archaeology have so far meaningfully contributed towards the study of genesis and variegated facets of EVF communities of Eastern India (Chakrabarti et. al. 1993: 123-35, Chakrabarti 1993, Datta 1995, 2004-05: 59-72, Mukherjee 1967: 36-42, Ray and Mukherjee 1992: 107-34, Singh 2002: 127-50). Encouraged primarily by the evidences at Pandurajardhibi, many individual authorities and institutions have so far worked on this less known phase of Eastern Indian history. Authorities have often put emphasis, in the context of West Bengal, on 'Chalcolithic' (Chakrabarti 1999: 241,

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Dasgupta 1964, Datta 2004-05: 59-72, Mukherjee 1967: 36-42, Pal 1992: 101-6), 'Ferro-Chalcolithic' (Ghosh and Nag 1989: 116) or 'Black and Red Ware Culture' (Datta 1995) in order to underline multifarious aspects of culture and economy of this phase.

In spite of more than a decade of research on the EVF phase of human culture in Eastern India, our understanding of the subject is, as a matter of fact, still inadequate. However, this statement, by no means, seeks to minimize the empirical merit of the pioneering works by scholars like Dilip K. Chakrabarti, particularly his observations on various aspects of the present theme of research. The present paper is an extension, rather than a critical assessment, of the works carried out so far by the eminent archaeologists in the field.

Scope of the present study

The focal points of concentration of the present essay are: 1. to provide a first hand report of the freshly explored EVF sites in the South Bihar plains and West Bengal. 2. to attempt an overview, in the light of excavated and explored sources, of the processes of development of EVF cultures of Eastern India and 3. to offer observations on some alternative perspectives from which one can visualize the major issues related to the genesis of EVF culture and economy in the region.

The paper is the outcome of a thorough survey of the published details of major excavated EVF sites in Eastern India with special reference to West Bengal and South Bihar. When compared to the excavated database that form the prime source of studies on EVF settlements in Eastern India, the explored materials from many of the sites, visited/explored during the last few seasons have remained more or less unreported or at best passing references in works dealing with the distribution and patterning of archaeological settlements in the different geographical sectors of the lower Ganga valley (Chakrabarti 2001: 160-90, Gupta: 83-100).

Distribution of sites in the South Bihar Plains

If a comprehensive archaeological understanding of the present study area is attempted, the best approach is through a comparison of the basal geology of this tract with the patterns of land utilization strategy presently prevalent in that country. On the basis of this comparison we have divided the total study area into three geographical-functional zones. The whole of the densely forested landscape bordering and occasionally geographically integrating with the Chhotanagpur plateau is a Gneiss basement complex, intersected by still older Gondwana formations at some places. Ethnic socio-economic infrastructure in this region is almost entirely dependent on the available natural resources from the forest extracts, except for a few highly industrialized tribal areas. As one moves north of this zone, occasional intrusion of Archean Schist increases. In this part of the country agriculture is based primarily on the production of *ravi* crops, along with increasing herding aided by sufficient availability of bushy outcrops. Moving horizontally further north one confronts the actual plains of South Bihar, characterized by older and new Alluvium fed by the east-west flow of the Ganga. Agriculture, with large scale seasonal production of paddy and wheat, along with other minor agrarian products, forms the major means of land exploitation in this area. This apparently tentative segmentation seems to represent the actual nature of man-environment relation in the whole of the South Bihar. Four seasons of exploration in the different segments of the plains (roughly falling between 83°58′–87°46′ N and 24°24′–25°56′ E) have resulted into the exposure of a number of BRW bearing sites in the three above geographical segments. A brief first hand report of explorations along with occasional notes on earlier works at these sites is presented in what follows:

1. The area known as **Jhimjhimia-Kalisthan** in the district of Sahebganj (part of the British Indian district of Santhal Pargana) is a combination of five villages

called Malkasba, Phulbagh, Turtipur, Begampur and Gadaganja. Occasional discoveries of BRW, Black Slipped Ware (BSW), Northern Black Polished Ware (NBPW), grey and red wares with a variety of types, have been reported earlier. The principal habitation mound in the village of Turtipur was excavated by the Bihar State Directorate of Archaeology between 1987 and 1989 (IAR 1987-88: 12-3, 1988-89: 8-9). A visit to the site clearly reveals two distinct occupation areas. The larger excavated settlement has been mostly destroyed by the railway line, although one can still notice, on the lower mound area (which was evidently not excavated), a modest BRW layer overlain by a thick early historic habitation deposit with characteristic blackish soil. Pot-sherds of NBPW with brown and pink tinge, chunks of banded agate and iron slag may be indicative of an activity area with industrial evidence. The main BRW settlement is found about half a km to the west of the principal mound, though the succeeding early historic or early mediaeval phases in this area are inconspicuous. It is very difficult to comment precisely either on extent or hierarchy of this cluster of settlements, although an extension of more than 10 acres for the settlement at the Jhimjhimia-Kalisthan area has been suggested (Chakrabarti *et.al.* 1995: 129-47). Extending due north up to the Kalitala-Kailash Pottery area, if all the locations of surface scatters are taken into consideration, particularly towards north and west up to the border of Phulbagh and the river, this figure seems open to doubt.

2. The comparatively wider alluvial tract between Sahebganj and Bhagalpur is a core zone of early historic-early mediaeval occupation, the most interesting being the remnants of the ancient 'city' of **Champa**. The first official archaeological exploration at Champa was conducted in 1968-69 by Patna University under the direction of B. P. Sinha. Excavation at three different locations, both on the core mound in the plateau surface and outside its 'walled' boundary was conducted by the same authority between 1969-70 and 1982-83 with a few gaps. The composite chronology at Champa shows a three-fold cultural occupation at the site starting from BRW levels to c. AD ninth-tenth centuries (Chakrabarti 2001: 166-7). The present exploration at the site has resulted in the discovery of plain and painted varieties of BRW mixed with NBPW and some associated wares in the form of spouted vessels of fine black and grey wares. Presence of large numbers of terracotta sling balls deserves special mention.

3. The excavated site of **Oriup** is situated 2 km southwest of Antichak. Excavation (Sahay 1978: 8-16) has revealed a four-fold sequence of the site between BRW and mediaeval levels. Periods I and II have yielded BRW. The most interesting feature of the site is the association of the BRW, like Champa, with NBPW at a level (Period II) where the latter predominates. Among artefacts associated with BRW, special mention should be made of Microliths, copper objects, bangles made of tortoise shell and variety of terracotta objects. During exploration, however, large number of iron slags were noticed around the main mound of the site.

4. **Jahangira** practically forms the island in the background of outliers at **Sultanganj**. Although no definition of a site can now be justified in the region, except surface scatters having no proper contextual character, BRW has long been reported from the area (IAR 1968-69: 5). The present exploration has also revealed sporadic distribution of BRW at the site along with terracotta balls and ageless varieties of dull red and grey wares.

5. Running parallel with the Kharakpur hill range from Surajgaraha is the modern village of **Uren**. Reported by Cunningham (1873), Beglar (1878), and Waddell (1892), Uren, an Early historic site showing continuous occupation up to the early mediaeval phase. But the issues of settlement structure, site coordinates, territorial character of the site and evolutionary aspects of the settlement have hardly been dealt with, except

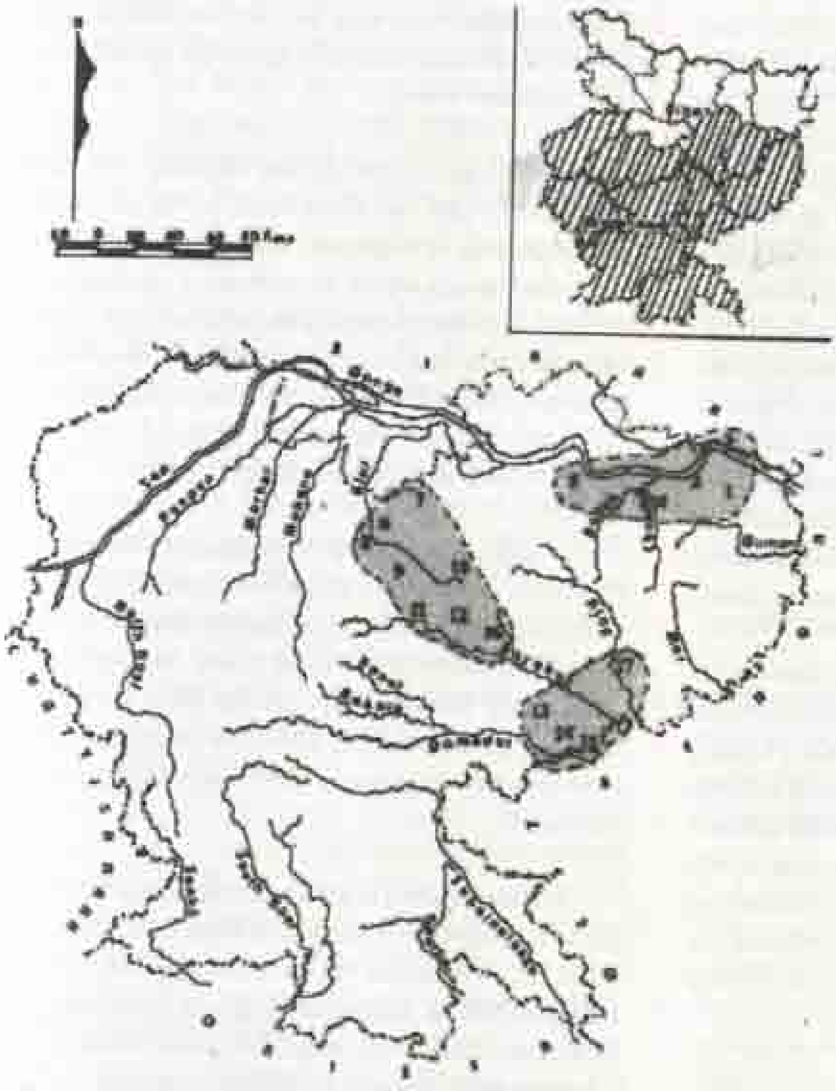

Fig.1: Distribution of clusters of EVF sites in the South Bihar Plains mentioned

an estimation of the extent of occupation (Chakrabarti *et. al.* 1995). Present investigation has revealed considerable information on the EVF character of settlment of Uren. The whole of the village forms part of a massive site, now represented by a number of dissected mounds in different sectors of the village.

A thorough scraping of a cliff section of the mound in the northern sector of the village shows a continuous occupation from BRW to mediaeval levels. Definite evidence of habitation debris with characteristic black soil showing clear horizons of BRW and early historic periods has been traced. Large concentration of BRW, BSW, NBPW, associated wares like Red Polished Ware (RPW hereinafter), red ware with chocolate slip, plain grey ware, grey ware with thin black slip and salient types with spouts are clearly visible. BRW at the lowest level, however, predominates.

6. **Surajgarha** is well known for its large concentration of sculptural material. The present survey has revealed BRW and associated wares in habitation debris found nearly half a km west of the present township. Scatters of mixed potsherds continue all along the surface. Early historic context is hard to determine through exploration, but continuity of settlement is presumable. A rural early farming village community can be conspicuously vindicated in the light of discovery of similar settlement determinants like those of Uren.

7. Reported for the first time within the larger cluster of Uren-Surajgaraha-Balgudar-Rajaona cluster, **Khairadih** represents the impression of a small village settlement of BRW phase (roughly mid second millennium BC) with a distinct habitation mound strewn with characteristic black slipped and both slipped and plain varieties of red and grey ceramics as well as stone and bone objects across the periphery. Iron slag is noticeable, but limited nature of exploration has not revealed the character of early historic settlement. Surface scatter of ceramics may suggest continuation of the settlement.

8. Reported earlier by Cunningham (1873) and Beglar (1878), **Rajaona** is already famous for its archaeological and epigraphic potential. A thorough survey of the locality reveals two structural mounds, one overlain by a modern Siva temple, while the other showing no identifiable character. Below the second one, one finds thick concentration of Black Polished Ware (BPW hereinafter) and associated ceramics within a habitation debris. The whole area possesses a large number of dissected mounds, all with characteristic occupation deposits having almost uniform scatter of known early historic types. Metal slag and working zones have been attested at different locations in the village. Few sherds of NBPW were also attested by us. Fragments of human and animals figurines of terracotta and bone objects for fishing are the other notable finds.

9. The most striking similarity of the archaeological contexts of Uren and **Nongarh** are the dissected mounds around the habitation area within the modern village, although at Nongarh their dimension is visibly modest. Towards the north, near a hillock, one comes across a minor concentration of strewn BRW on the surface, with associated BSW. Gradually towards south one can find a growing percentage of surface scatter of comparatively late ceramic types, though in a hopelessly mixed condition.

10. Buchanan (Oldham 1830), Cunningham (1873) and Beglar (1878) reported **Indpe** ('Indappe') as a fortified settlement of the 'Pala-Sena' period, their description of the rampart and the internal settlement with *stupa* mound being characteristic of early mediaeval settlement planning.

The present survey may add some new dimensions to this site. Although nothing can be commented upon the nature of settlement, discovery of BRW sherds in an overlapped context may have some significance in terms of the over all growth of village settlements in the locality. Early historic ceramics from Indpe are now found scattered over a large area with occasional sherds of NBPW, at some places being mixed up with BPW and associated wares.

Archaeologically two distinct territories, due north and south, can be visualized in terms of the geomorphology of the region. The northern plateau area across the Nawada region, as we shall see, shows growth of larger early historic settlement with some continuing up to the early mediaeval period, while in the southern zone early farming sites have been found, some of them showing a distinct succeeding phase. Sites in the northern-northwestern zone are as follows:-

11. Approachable from Wazirganj, the site of **Kenar Chhati** is basically a large structural mound with extensive brick activities. Architectural fragments and *Siva-lingas* can be seen on and around the core mound respectively. Present survey yielded BRW and NBPW in mixed status with RSW, BSW, red (slipped and plain varieties) and grey wares. Few iron pieces were also recovered.

12. Situated south of the former site following almost the same alignment is the site of **Miarl**. As one moves north, the extension of the site is not less than 25 acres. BRW and NBPW with silvery tinge can be occasionally picked up, along with associated wares. Although no other types of artefacts have been recovered, pottery scatter can be traced all along the surface. Few smaller locations with metal slag are also visible. Average site size should be less than an acre.

When compared to the northern zone, the southern territories of the Nawada plateau exhibit denser concentration of EVF sites major explored sites mentioned below are the:

13. Almost the entire village of **Paundra** is situated on a sloping mound, although its alignment is not clear. Altogether four clusters of BRW assemblage spreading

over 5-6 acres with associated ceramics were traced by us. Strewn potsherds are interestingly always in clusters, particularly for BRW. Chunks of agate, few NBPW sherds, and large number of bone fragments of turtle, metal slag, evidence of postholes at eroded surfaces and terracotta game objects collectively suggest a larger village settlement.

14. The village of **Katrasgarh** is one of the most potential BRW bearing sites in the region. The only exposed BRW mound of the village shows distinct evidence of postholes along with sufficient occurrence of BRW and associated BSW with spouts of terracotta bowls and vessels. Fragmented pieces of fishhooks, arrowheads, points and antlers are the notable bone objects. Among stone objects mention may be made of Microliths, fragments of ground and polished stone tools and ring stones. Notices of cut bones of fish and turtle on the section along with charcoal, are significant. Some unidentifiable iron objects were also recovered as a result of section scraping.

15. When compared with Katras, **Kumardubi** represents a small and hence minor site. The major archaeological assemblages are demonstrated by two clusters (approx. 1 acre each) of BRW deposits mixed with other ageless varieties of pottery. Stone and bone industry witnessed at the site are similar in character with Paundra. Some fragments of terracotta beads and net sinkers were collected in one of the field seasons. Two of the most significant discoveries at Kumardubi are the workshop of pre-industrial iron smelting and extensive scatter of turtle bones.

16. The minor site of **Karandiha** has yielded, besides BRW, quite a few numbers of BSW and RSW having different types of spouted varieties. Except a few fragments of Microliths, no specific archaeological object in a justifiable context could be recovered from the site, which at present rests in a highly disturbed state.

17. **Sarath** in the area around represents mere locations of occurrence of BRW industries with later types whose actual affinity has not been possible to determine. Large numbers of fishing implements in the form of fishhooks and fragmented harpoons have been noticed at the site. Pottery belonging to dull red and grey wares occurs either in cluster or as stray scatters. Its character, however, is unclear since they are in a highly mixed context. The site also contains a slag deposit associated with habitation debris. It is important here to note that the site of Barudih in Singhbhum within the Chhotanagpur heartland has long been reported in the context of its location and possession of BRW in combination with iron and polished stone tools (Chakrabarti 1993: 201).

Distribution of newly explored sites

A number of BRW bearing sites have recently been explored on the valley of Damodar and its tributaries in the district of Barddhaman. The following are the notable sites so far explored:

1. **Punchra** (23°42′15″N/87°01′50″E) is a large old village near Asansol, already well-known for its enormous sculptural resources. Among many of the localities in the village containing artefacts of early mediaeval antiquity (Chattopadhyay, Sanyal and Saha 2006: 127), is the area called Chowrangee More, basically a mound now occupied by modern habitation. The exposed areas contain scatters of BRW and associated pottery, iron slag, fragmented terracotta crucibles and pieces of nozzles of terracotta tuyere. Some of the neighbouring localities like Gaurandi-Panuria and Domahania have also yielded a few sherds of BRW as stray finds from disturbed contexts.

2. **Sheharsole** (23°36′15″N/87°06′E) is also a large sculptural site. During exploration, one of the oldest settlement areas yielded BRW associated habitation debris. Hijalgarh, Chakdol, Badalpur, Gram-Andal and

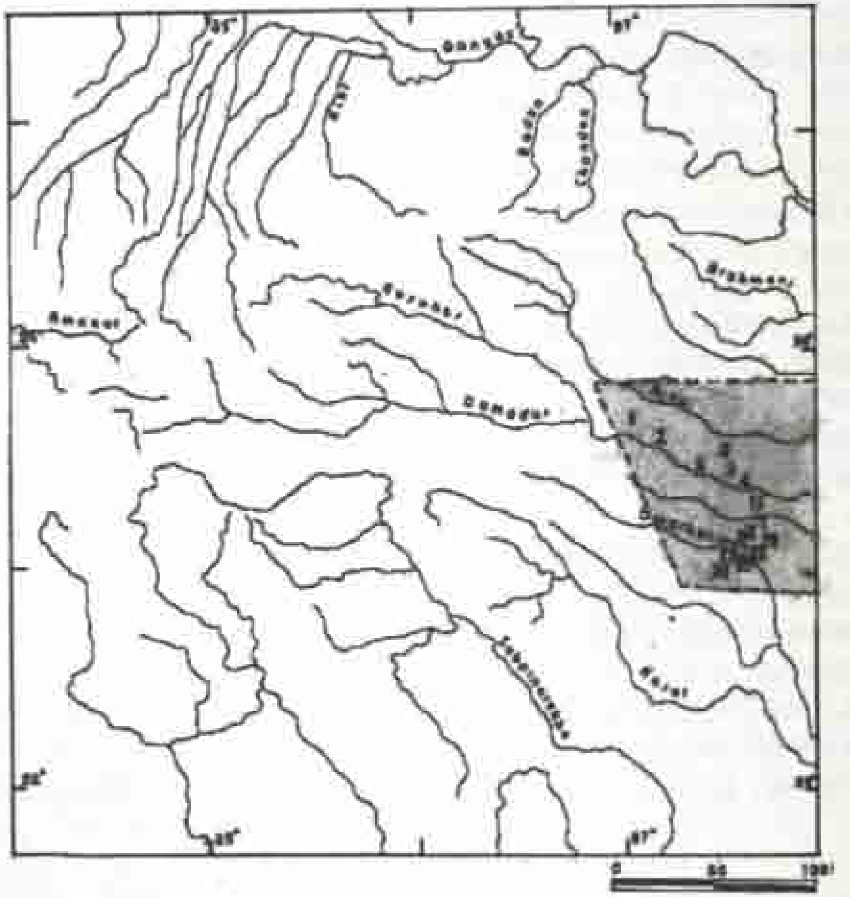

Fig.2: Distribution of newly explored EVF sites in West Bengal mentioned in the text

Ukhra are the neighbouring localities having habitation remains, although their context has to be determined with further fieldwork in the area.

3. **Birbhanpur** (23°28′45″N/87°24′E) is a noted archaeological site containing a sequence from prehistoric to historical periods. It lies on the north bank of the Damodar Valley Corporation Water Reservoir (Durgapur). Unfortunately the main habitation mound has been submerged under the reservoir. However, old habitation ruins in the form of scatters of pottery including BRW and terracotta artefacts at Sankheswaritala deserve special mention.

4. The old locality of **Pairagpur** (23°26′50″N/87°30′ E) may be identified as an extension of the present Panagarh *bazaar* along the Grant Trunk Road. There are old habitation areas traceable along the banks of large tanks and cultivable areas, besides a place in the village Pangarh that has also yielded stray BRW sherds and some fragmented terracotta pieces.

5. The village of **Rakshitpur** (23°33′30″ / N87°26′ E) on the valley of river Kunur in the district of Barddhaman is located about 1km southeast of Malandighi. The site has yielded coarse sherds of black BRW. Later continuity of occupation is noticed at the site. Kunur flows only 1km south of the village.

6. The site of **Saldanga** (23°28′30″N / 87°20′ E) on

the Damodar in the district of Barddhaman is located a few km downstream of the Damodar from Bharatpur. Now the mound of the place has now been transformed into cultivable fields, but its blackish soil and scatters of coarse BRW undoubtedly indicates the existence of a major BRW site in the village.

Quite a few BRW bearing sites have recently come to light as chance discoveries during exploration in the Police Station of Galsi in the district of Barddhaman.

7. **Simisimi** (23°16′48″N/87°35′36″E) is located just on the right bank of Damodar and possesses BRW sherds as part of a mixed assemblage close to a structural mound near a late mediaeval temple. Besides, a number of neighbouring villages including **Malla Sarul** (23°17′35″N/87°36′20″E), **Kaitara**, (23°17′10″N/87°38′24″E), **Bikrampur** (87°36′N/23°16′07″E) and **Kashpur** (87°35′N/23°17′E) have yielded BRW assemblages from primary contexts (Sanyal 2006).

Among the sites recently discovered in the district of Bankura in the valleys of Sali and Darakeswar rivers, the following deserve detailed note:

8. **Antra** (23°13′N/87°34′30″E) is located about 3 km northeast of Patrasayar in the valley of river Sali. This explored site has yielded BRW, early historic and mediaeval potteries and several terracotta balls. Villagers gave us some cut conches during exploration which they found during local digging activities.

9. **Balarampur** (23°13'30"N / 87°33'30"E) is situated about 2.5 km northeast of Patrasayar. The village lies at a picturesque bend of river Sali. The village and the high cliff section of the Sali have yielded BRW mixed with many other ageless types. The context of the coarse BRW specimens, however, demands further enquiry.

10. The village of **Dayalpur** (23°13'N/ 87°34'30"E) is located just by the northern side of Antra. The site has yielded fine and coarse BRW, red ware, grey ware and a single piece of Microlith on Quartz. The only prominent mound in the village is actually a flat tableland that has so far remained undisturbed. Sali is the closest river course, while the Damodar flows about 5 km north of the village.

11. **Konra** (23°23'N / 87°07'E) is located on the foot of the hill of the same name about 1 km south of the village named Amarkanan. Konra has yielded BRW sherds, though the mounds have mostly been transformed into cultivated fields. Besides, mediaeval pottery occurs as surface scatters in the different habitation sectors of the village. Near the junction of the hill and the plain, where Sali takes a turn overlooking the Konra hill (154m) in its southeastern part, one comes across profuse numbers of Microliths made on Quartz or Chert. Among specimens collected, mention may be made of point, scraper, blade, backed blade and lunate. The site is known to have yielded polished stone tools.

12. **Kantor** (23°08'30"N / 87°30'E) is located on the left bank of river Dwarakeswar, about 3 km south of Jamkuri and has yielded a few sherds of BRW as surface scatters. It may be noted here that occurrences at Kantor are hardly primary in context, though their broader spatial connection cannot be denied.

13. The site of **Kholamdanga** (23°08'30" N / 87°26'45"E) is located on the right hand side of Patrasayar-Bishnupur Road, about 1 km southwest of Kangrasol. The original habitation mound in the village has been totally destroyed, being leveled into agricultural land. Probably a portion of the mound also got damaged during the construction of the road. A number of BRW sherds were from the area. It is quite likely, in the light of the pottery explored that the Kholamdanga formed a pottery manufacturing site. The site deserves excavation.

14. **Rameswarkura** (23°07'N/87°25'30"E) is situated 4 km south of Kushadwip on the left bank of Dwarakeswar adjacent to **Naricha**. We have found BRW and a bone tool in the playground in front of Rameswarkura Primary School. In the cliff section of Dwarakeswar at Naricha, extensive remains of pottery can still be noticed.

15. The site of **Pandua** (23°08'N / 87°26'E) is situated about 3 km southwest of Kangrasol on the two sides of Balsi-Vishnupur Road. The open area in front of Pandua Hospital yielded BRW sherds. The joint flow of the spill called Haringmuri and Chhota Kandar *nala* flows to the south of the village. Dwarakeswar flows only 2.5km south of the village.

16. **Sahpur** (23°10'30"N/87°24'45"E) is located 3 km northwest of Kushadwip in a forested environment. Exploration of the site has yielded BRW as stray occurrences.

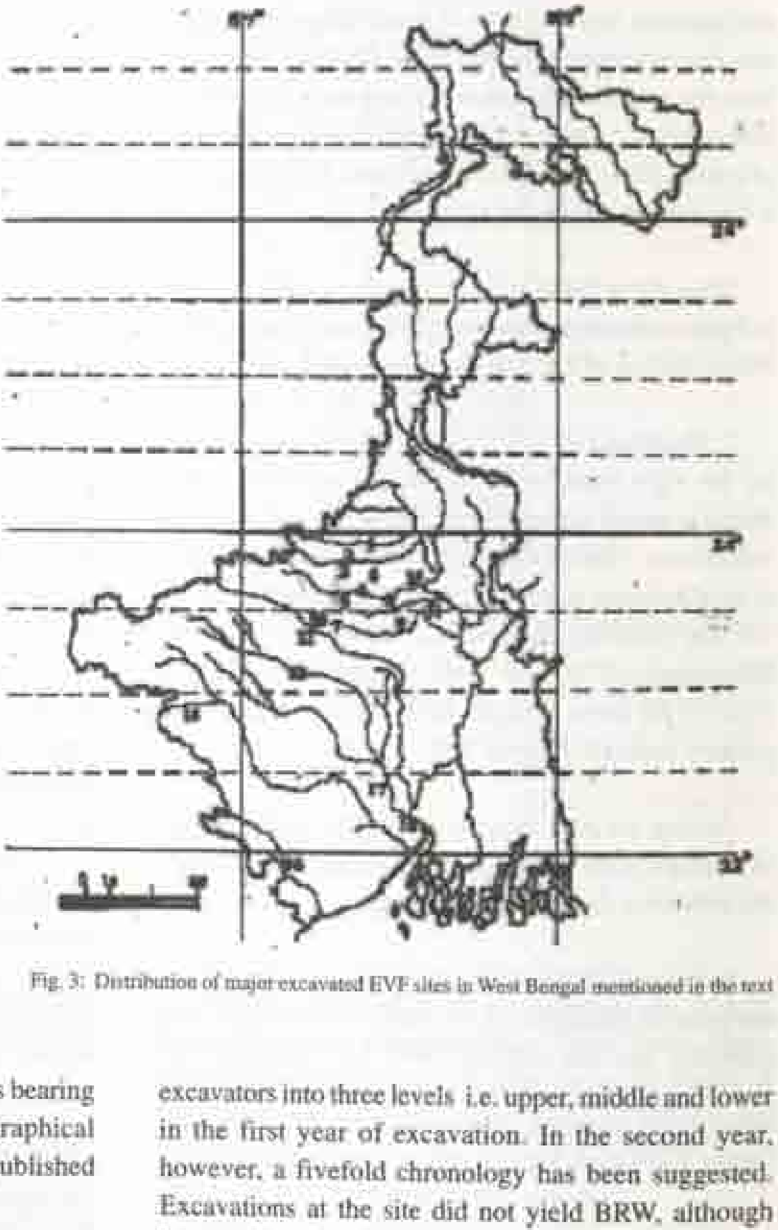

Fig. 3: Distribution of major excavated EVF sites in West Bengal mentioned in the text

Distribution of excavated sites in west bengal

There are as many as twenty excavated sites bearing traces of BRW occupation in varying geographical niches. A brief account of the database so far published is presented in the following:

1. **Kotasur** (23°58'N/87°45'E) is located on the left bank of Mayurakshi in the Birbhum district about 5 km northeast of Sainthia Railway Station.The site was excavated by the Dept. of Ancient Indian History, Culture and Archaeology, Visva Bharati University,under the general supervision of N.C.Ghosh and A.K. Nag from1986-88. The total 3.60m excavated occupational deposit was broadly divided by the excavators into three levels i.e. upper, middle and lower in the first year of excavation. In the second year, however, a fivefold chronology has been suggested. Excavations at the site did not yield BRW, although later explorations by various authorities have resulted in the discovery of BRW and related assemblages from the site (IAR 1975-76: 58).

2. **Hat Ikra** (23°49'25"N/87°35'42"E) is situated on the left bank of river Bakreswar which flows about 1km west of the present village. On behalf of the Dept of Ancient Indian History, Culture and Archaeology, Visva Bharati University, N.C. Ghosh and A.K. Nag excavated

the site in 1985-86. The total occupation deposit of the excavated mound of Hat Ikra has been divided into two periods, i.e. 'Chalcolithic' and 'Ferro-Chalcolithic'. While the IAR (IAR 1986-87: 94) report claims that a maximum deposit of 2.40m has been revealed at Hat Ikra. The *Puratattva* report (Ghosh and Nag 1984-85: 117) suggests a 2.55m thick deposit. The Chalcolithic period at the site is about 78cm thick on an average and has a maximum thickness of 1.30m. Only one C^{14} date, 2950±120 (1000 B.C.) from the beginning of Period II, is available from Hat Ikra.

3. **Haraipur** (23° 52'N/87°35'E) is a small village by the side of the Bolpur-Siuri Road. In 1964-65 the Eastern circle of Archaeological Survey of India (ASI hereinafter) has conducted a small scale excavation at the site under the supervision of R.C. Kar, R.G Pandya and Amir Singh. The excavation revealed a 3.5m thick occupation deposit, which has been divided by the excavators into six layers. The Chalcolithic habitation deposit is about 2.6m thick. No clear cut chronocultural sequence has yet been published. The chronology of the site is also yet to be established. The most important discovery from the site is that of ten child burials. Besides, plain and painted BRW were found between the layers 6 and 3. Other ceramics of the site are Black-on-Red Ware, white painted red ware and a dull red ware. Burnt clay nodules with reed impression and a charred wooden pole (4cm in diameter) have been discovered. Other finds from the site include short beads, ground and polished stone celts, a stone pestle, and bone points.

4. **Mahisdal** (23°42'N/87°42'E) is situated in the southern part of district Birbhum on the left bank of river Kopai. A small scale excavation was conducted at the site by R.P. Das on behalf of the Eastern Circle of ASI in 1963-64. The mound is located about 0.25km south west of the modern village near the railway bridge. A maximum deposit of 2m has been exposed. The total cultural deposit was divided into two periods by the excavator of which the first one has been termed Chalcolithic. Four C^{14} dates are available from Mahisdal: three from Period I and one from Period II. The three C^{14} dates from period I are 1380 B.C, 1085 B.C and 855 BC. According to Chakrabarti the earliest calibrated date range of Mahisdal is 1619-1415 BC.

5. **Bahiri** (23°39'N / 87°40'E) was first identified as a BRW bearing site in 1971-72 through the exploration conducted by the Eastern Circle of the ASI (IAR 1971-72: 81). The site is situated in the flood plain of river Ajay on the Bolpur-Palitpur road about 7 km east of Bolpur in the district of Birbhum. Dilip.K. Chakrabarti and S. Jamal Hasan's works on the mounds of Chandra Hazrar Danga on behalf of the Dept. of History, University of Delhi, unearthed cultural remains divisible into the following three periods:

Period I: c. 1000+ BC-c.500 BC; Period II: c. 500 BC–200 BC; Period III: c. 4th-6th centuries AD (Chakrabarti and Hassan 1982: 111-49).

Period I has been identified on the basis of the occurrence of plain and painted BRW and associated ceramics. Iron is found right from the beginning of this period. The above mentioned dating of Period I was further substantiated by three radio-carbon dates which are 900 BC, 660 BC and 610 BC respectively. The recent calibrated date range from Bahiri, Period I is 1112-803 BC (Chakrabarti 1999: 242).

6. **Nanur** (23°42'N/87°57'E) is located in the south eastern part of the district of Birbhum about 20 km northeast of Bolpur on the Bolpur Kirnahar road. The mound was first excavated by K.G Goswami on behalf of Asutosh Museum, University of Calcutta in 1945-46, followed by an excavation by the Eastern Circle of ASI in 1964 that resulted in a BRW bearing occupation horizon. It also revealed that the site was under occupation from Protohistoric to modern times intervening through the historic and mediaeval periods.

The lower levels of the site are comparatively undisturbed and have been divided into two periods. Periods I and II of the later phase of excavation have been taken to represent two segments of the Chalcolithic cultural phase.

7. **Pandurajardhibi** (23°25'N/87°39'E) is situated in the village of Panduk, Police Station Ausgram in the district of Barddhaman on the right bank of river Ajay. It is the first excavated EVF site of Eastern India. The mound is both extensive and a high one compared to the other mounds of the region. It is about 5m high and occupies an area measuring approximately 8 acres. The site was excavated twice, for the first time from 1962-65 and in 1985 for the second time. After preliminary exploration, excavation started from 1961-62.The excavation was conducted under the supervision of P.C. Dasgupta, assisted by D.K. Chakrabarty and S.C. Mukherji on behalf of Directorate of Archaeology, Government of West Bengal.

The first phase of digging confirmed a five-fold chronology of which the Periods I, II and II yielded BRW and related assemblages. However, a modified chronology has offered a four-fold division of the cultural assemblages. Period I: Chalcolithic; Period II: Prosperous Chalcolithic; Period III: Iron Age overlapping with the preceding culture (Phase a) and Period IV: Early historic and Medieval (Phase b). Only one C^{14} date is available for period II of Pandurajardhibi from the excavation of sixties. It is 1012±120 BC (not calibrated).

8. **Mangalkote** (23°31'N/87°56'E) is situated in the district of Barddhaman on the eastern bank of Kunur, near its confluence with Ajay. The site was excavated from 1986-90 by the Dept. of Archaeology, University of Calcutta under the general supervision of A. Ray, C. Gupta, A.C. Pal, S.K. Mukherjee and colleagues, followed by a second phase of digging in 2005-06 by R.K. Chattopadhyay. Excavations at the site were conducted in a limited scale on four mounds of the locality. These are Vikramadityerdhibi (Sarkaridanga), Manumiyardanga (near Madrasah), Kacharidanga (near the confluence of Kunur and Ajay) and Kolubaridanga. The excavation produced evidence of an average habitation layer of 6.50m (Ray and Mukherjee 1992: 109), which was 5.20m-5.50m in slope areas. The whole occupational deposit has been divided into 5 consecutive periods. The last excavation of 2005-06 at Kolubaridanga, aimed at focussing on early mediaeval archaeology of the site, revealed no BRW bearing horizon (Chattopadhyay, Sanyal and Saha 2006: 119-21).

Period I: Chalcolithic (1200-600 BC). Only one C^{14}date is available for period I. It is 2870±115/110 BP corresponding to 940 BC. On the basis of this radiocarbon date the excavators have dated the Chalcolithic period of Mangalkote between1200-600 BC. The calibrated C^{14} date range of Mangalkote is at par with Bahiri, i.e.1112-803 BC (Chakrabarti 1999: 242). All the later periods have been dated to historical eras, although BRW remained a steady element in the succeeding Periods II and III.

9. **Baneswardanga** (23°24'N/87°59'E) is situated 29 km northeast of Barddhaman in the village of Barabelun within the Bhatar Police Station. The mound was excavated by the Directorate of Archaeology, Govt. of West Bengal in 1974 under the direction of P. C. Dasgupta. The short report of later excavation by D. K. Chakraborty divides (Ghosh 1989 [vol. II]: 52-3) the total cultural repertoire of the site in three periods of Chalcolithic, Iron Age and Historic with a break between the first two. On the other hand, in the complete report (Mukherjee 1993-94: 80-143) one comes across the following chronology of the site:

Period I: Early Chalcolithic; Period II: Late Chalcolithic; Period III: Transitional between Chalcolithic and Iron Age; Period IV: Early historic and

Post Gupta to Pala; Period V: Late Mediaeval.

The Chalcolithic habitation at Baneswardanga starts right on top of the natural soil with a deposit of 2.30-2.40 m. There are occasional breaks between Periods I and II and again between Periods III and IV. No C^{14} dates are available for the site. But as it shared all the characteristics of the 'Chalcolithic' and 'Iron Age' found at Pandurajardhibi, Mangalkote and other sites in West Bengal, it seemed to the excavator that the date of the Chalcolithic phase at Baneswardanga would be around 1000 BC.

10. **Bharatpur** (23°24'N/87°27'E) is a small village in the district of Barddhaman on the left bank of Damodar. The site is located about 7 km southeast of Panagarh station. The site was jointly excavated by the Eastern Circle of ASI and the University of Burdwan under the direction of S.C. Roy, assisted by others.Digging continued from 1971-72 to 1974-75, revealing a fourfold cultural sequence from 'Chalcolithic' to 'Late Historic' (Ghosh1989 [vol. II]: 66-7): Period I: Chalcolithic; Period II: Early historic; Period III: Could not be dated definitely owing to lack of datable materials; Period IV: c. AD 9th -10th centuries.

Three C^{14} dates (IAR 1974-75: 77) are available for Period I of Bharatpur. The earliest of them comes from the mid level of the Chalcolithic phase and accounts for c. 1435 BC. The two other dates from Bharatpur are 1180BC and 900 BC respectively.

11. The Directorate of Archaeology and Museums, Govt. of West Bengal has conducted trial diggings at **Charul** (23°30'N/88°15'E) in the year 2003. The site is located on the Brahmani in the Katwa subdivision. Sporadic occurrence of BRW has been reported at a depth between 1.20 and 2.00m.

12. **Pakhanna** (23°24'45"N/87°22'40"E) is situated on the southern bank of Damodar, in the Barjora Police Station of the district of Bankura. The site was excavated by the Dept. of Archaeology, University of Calcutta, under the general supervision of Chitrarekha Gupta, A. C Pal, M. Mita, A. Datta and R.K. Chattopadhyay from 1996-97 to 1999-2000 and again in 2001-02. Five main areas, *viz.* Bhairabdanga, Satbardanga, Garerdanga, Itapara and Kalyanpur were excavated, of which only Bhairabdanga and Satbardanga have yielded evidence of EVF occupation.

The site is highly disturbed due to continued human intervention and modern settlement growth. Regular fluvial activities of the Damodar have also acted as a major element of destruction. However, both the Bhairabdanga and Satbardanga area have yielded evidence of EVF phase of culture (IAR 1996-97: 177-8, 1997-98: 200-3). The 2001-02 excavation on the mound of Bhairabdanga confirmed earlier finds. On the basis of the plant remains collected from the site, the Chalcolithic level of Pakhanna has been dated to 3320±400 years BP (Ghosh *et. al.* 2005: 221-32).

13. **Dihar** (23°07'10"N/87°21') is situated on the left bank of river Dwarakeswar in Bankura district, Police Station Bishnupur, about 6 km north of Bishnupur town. The site was excavated twice for the first time from 1983-84 to 1984-85 and again from 1990-91 to 1994-95 by the Dept. of Archaeology, University of Calcutta under the general supervision of A.C. Pal (Pal 1992: 101-6). The total cultural deposit of the site is divided by the excavator into two broad periods viz. Chalcolithic and Early historic. Since both painted and plain BRW occur together at Dihar, the excavator believed that the occupation belonged to a comparatively late Chalcolithic horizon.

14. **Tulsipur** (22°56N'86°46'25"E) is located on the right bank of river Kangsavati below its confluence with the Kumari near Kangsavati reservoir. Chakrabarti (Chakrabarti 1993: 130) estimated 1 acre as the site size.

Before her excavation at the site in 1967-68, J. Birmingham of the University of Sydney in collaboration with the Eastern Circle of ASI explored the region near Tulsipur-Ambikanagar (IAR 1965-66: 57-8) extensively and Tulsipur was identified as a BRW bearing site. Further exploration by Chitrarekha Gupta has revealed the occurrence of coarse BRW representing shapes like angular shallow bowl, red ware, fine textured grey ware and a good number of late historic red slipped ware.

The brief excavation report (Birmingham 1972: 1-23) neither contains layer-wise stratigraphy nor the detailed description of the evidences of material culture unearthed. However, the ceramic assemblage from the site has been studied in detail.

15. **Sijua** (23°37′N/88°02′E) is a small village located on the left bank of Kasai or Kangsabati near Bamal, the famous 'Neolithic' site of Medinipur district. It is about 7 km from Ramgarh. The site is located within an undulating landscape near the modern village of the same name but outside it. Test diggings at the site by the Directorate of Archaeology and Museums, Government of West Bengal, revealed the existence of Chalcolithic Culture at the site. The mound has been irretrievably damaged by regular erosion. The total occupational deposit of the site measures 1.50m and is divided into two distinct periods: Period I: Chalcolithic; Period II: Early historic.

16. **Moghalmari** (21°57′N/87°16′E) is located in the district of Paschim [West] Medinipur, in the Police Station of Dantan. The site is located on the left bank of the Subarnarekha about 5.4km north of Dantan town. The site was excavated by the Dept. of Archaeology, University of Calcutta, under the direction of Asok Datta in the field seasons of 2003-04 and 2006-07 to identify the proper location of ancient *Danda bhukti* (Datta 2004) and resulted into a twofold cultural sequence from 'Chalcolithic' to and early mediaeval. The Chalcolithic remains were found at a locality called MGM 2 and is represented by a deposit of 1.48m.The main pottery types discovered from the Chalcolithic period were BRW (both plain and painted varieties), red ware, black-on-red ware and black ware. Major shapes in pottery type included bowls, basins and *handi* along with different types of vessels.

17. **Tamluk** (22°22′N/87°55′E) is situated on the right bank of river Rupnarayan in Purva [East] Medinipur district. The site was excavated twice: first by M.N. Deshpande of the Eastern circle of ASI in 1954-55 (IAR 1954-55: 19-20 and Ghosh 1989 [vol. II]: 430) and again in 1973-74 by the Eastern Circle of ASI under the guidance of S.K. Mukherji and others (IAR 1973-74: 33). As a result of the second phase of excavation a four-fold sequence of the site was established. Of the four cultural periods, the first two revealed the existence of EVF settlements at the site.

Period I: The excavation, besides confirming the earlier known cultural sequence brought to light new evidence about the cultural phase of the pre-NBPW horizon. BRW in its characteristic shapes are found in this period. No regular habitation deposit could be traced owing to the limited scale of excavation. Neolithic celts and a variety of bone tools are the other finds of the period. The C^{14}date of Period I of Tamluk is 1350-1000 BC (?) based on the half life of 5730±140. Period II: The use of iron started at the site without any break. BRW of degenerated variety continued to occur.

18. **Natsal** (22°11′59″N/88°02′47″E) is located on the right bank of Rupnarayan, 2.5km east of Mahishadal of Purva [Esat] Medinipur district. The site has yielded BRW (Ghosh 1989 [vol. I]: 237). The Directorate of Archaeology, under the direction of Amal Roy, has conducted excavation at the site in 1999-2000. In the light of the small trial excavation, the excavator has tentatively divided the material remains from the site into three periods i.e. Protohistoric/ Chalcolithic (layer

5), Early historic (layers 3 and 4) and Mediaeval and Late Mediaeval period (Layers 1 and 2). Layer (5) starts from a depth of 2.10m and is composed of black sticky soil. Layer (5) has yielded BRW, Black Ware, Red Ware, bone tools etc.

Assemblage analysis

The majority of settlements in the western segment of the BRW bearing cultural horizon of Eastern India –— comprising of the Chhotanagpur fringe areas up to the Ajay-Damodar interfluves — were located at high 'terraces' (standing for the dialectic *danga*) and promontories overlooking rivers. Among many of the recognizable examples one can readily recall this spatial context at Panduker *danga* (Pandurajardhibi), Sal *danga* (Bharatpur), Chandra Hazrar *danga* and Muluker *danga* (Bahiri), Baneswar *danga* (Barabelun), Bhairab *danga* (Pakhanna) and Sarkari *danga* (Mangalkote). It is quite significant to note here that many of the above settlements like Pakhanna, Bharatpur and Mangalkote were located very close to the river cliff. It may be suggested that such a choice of location was compulsive in order to protect the habitation from occasional fluvial activities that characterize the whole of Bengal landmass over the centuries. On the other hand, such a choice provided enough scope to facilitate intensive exploitation of enormous lands for pastures and low-lying agricultural fields along the flood plains. There was an equal exploitation of wild and aquatic species through extensive hunting and fishing respectively, as evidenced from the material assemblages and locational character of sites like Tulsipur and Kumardanga. It also reflects the interrelationship between the ecological set up of the space and the strategies of subsistence and resource mobilization by the EVF communities of the region.

Structural remains from most of the EVF sites of Eastern India have been mostly found, primarily due to variegated geological-hydrographic factors, from highly disturbed contexts and in very poor states of preservation. Yet, evidences from sites like Pandurjardhibi, Mahisdal, Pakhanna, Bharatpur and Mangalkote clearly exhibit a steady development of sedentary settlements in the Ajay-Damodar and the Bhagirathi plains. A review of the available published database will amply testify to the existence of the following categories of structural remains at the EVF settlements of whole of the Eastern India: (a)mud/rammed floors, (b) reed impressed clay chunks, (c) occasional occurrence of hearths/ovens and furnaces, (d) larger strips of floor areas possibly indicating lanes/passages/open spaces (e) pit-silos, (f) refuse pits, (g) structural / storage-pits, (h) postholes, (i) industrial/manufacturing complexes or workshops (potters' and metal workers'), and (j) reed impressed clay reflecting extensive use of wattle-and-daub structures. A broad survey of the excavated data tends to suggest, that floors were made of beaten earth mixed in some cases with cow dung, supplemented by soling of rammed terracotta nodules; houses with reed-impressed clay plasters were the most common type of residence.

Among *Pottery*, BRW has remained throughout the EVF phase the most endemic type all over the Eastern India. Besides this omnipresent diagnostic category, three major pottery types prevail in explored and excavated sites in West Bengal. These are: the BSW, red ware and the grey ware. Among the many prominent types in BRW the various sub-types of bowls, spouted vessels (particularly bowls) and carinated *handi* often with featureless rim have featured steadily, although an excellent study on explored and excavated sources has clearly demonstrated the continuation of the various types of bowls even in the early historical phase (Birmingham 1972: 1-23). Occurrence of the BSW, on the other hand, has been found to be a characteristic trait of the BRW bearing sites in South Bihar and here also the various types of bowls predominate in both the wares. It may be noted that a steady occurrence of Red Slipped Ware — in association with the BRW —

amongst assemblages stratigraphically associated with the early historic deposits, is a general feature of the BRW bearing sites in West Bengal. An interesting aspect of the pottery assemblage is the association of the evidences with basketry, matting and fabrics. Many of the specimens collected during excavations and the present exploration have been found to retain such impressions. Since their application was restricted on perishable materials, pottery is the only source to demonstrate the nature of such category of artefacts. Sporadic occurrence of game objects made of rejected pottery base and hop-scotches might reflect unconventional usages of ceramic artefacts. Ceramic assemblages from sites like Pandurajardhibi, Bharatpur, Mahisdal, Pakhanna, Mangalkote emphasize the extensive activities of painting and staining with white pigment on particularly BRW, although such applications are also available on simple red ware painted with black or white. Designs executed include wavy lines, vertical and horizontal bands/strokes, sigma, chevrons, dots, ladders etc. It seems reasonable to suggest that the profound occurrence of the channel-spouted bowls and their varying sizes might reflect a specific functional aspect for this ceramic type in the daily life of the people, preparation and consumption of liquids in the form of liquor and milk and even as tiny bowls (still used in rural Bengal as *jhinuk/godol*) for feeding children.

Bone and antler implements of different domesticated, wild and aquatic species have so far been recovered from the sites in West Bengal, South Bihar and Orissa. Among the major sites one has to mention Senuar, Chirand (North Bihar), Pandurajardhibi, Mangalkote, Baneswardanga, Bharatpur, Pakhanna, Bahiri and Dihar (West Bengal), Golabai Sasan (Orissa), Oriup, Champa and Uren (South Bihar). Artefacts made of split/cut bones and antler consist principally of points, arrowheads, dagger, awls, scrapers, bone pins, antlers, borers, combs, flute, bangles, shell pendants and beads (for details of artefacts from major excavated sites in West Bengal, see Table 1).

Large number of worked-bone artefacts can also be observed as associated with leatherwork, fishing and hair dressing. Implements associated with hunting activities consist of barbed points and harpoons. Although barbed points have initially been used for fishing, their presence in forested plains in a new ecological setting might imply that these were more likely used in accordance with the space where they were exploited. Specimens used for sewing and weaving — and sometimes in specialized leatherworks — included slender points, awls and borers. Sickle hafts, typically made from split/cut bones (attested in stratified context in Bahiri in West Bengal), are often decorated with parallel lines or net patterns — a feature common to many bone implements from Pandurajardhibi. Decorated antlers, finely carved and polished, were found in large numbers at Pandurajardhibi. At a few cases sickle hafts were found in a state of preservation where they still contained sickle blades bearing lustre (found at Tamluk in West Bengal).

Stone objects form an integral part of the EVF archaeological deposits in Eastern India. Microliths have been recovered from almost all the micro-regional contexts of the region in review. Some of the evidences probably demand more attention that they have so far drawn. For example, the most striking feature of the Tulsipur lithic industry is its standardization in both application of techniques and choice of raw materials. Preparation of relatively short broad bladelets from prominently multiple-platform cores characterizes the industry. Raw materials like coarse-grained blackish chert, translucent chalcedony, milky quartz, and fine-grained quartzite were principal in making microliths. Besides, ground and polished stone tools and saddle-querns, either as fragments or in the form of well preserved specimens and mostly made on Granite have been reported from many of the sites in West Bengal and the only properly excavated one from Orissa (Table

2) Large number of pounding stones, mortar-pestle and grooved stones indicate milling and food processing strategies. Thus, functionally the stone tools so far recovered from the majority of EVF sites may be sharply divided into milling tools at an early stage and their use in agrarian activities at a later date, whereas polished stone tools in general definitely served purposes involving woodwork. It may be noted here that occurrence of polished stone tools found in areas like the Susunia foothills, Bhairabbanki-Tarafeni river valleys as well as hinterland Chhotanagpur sites like Barudih and the 'Asura' sites of the neighbouring territories (for Asura sites, see Chakrabarti and Lahiri 1988: 29-43) have been assumed as a separate category of assemblage related to the 'Neolithic' period, whereas one might well suggest their obvious association and/or local consumption with/within the BRW phase of culture. Hence, the involvement of forest dwellers and other indigenous folk in the manufacturing processes of polished stone tools and their association with the BRW using cultural elements is likely to have been contemporary.

Metal and the varying contexts of its occurrence in the EVF sites all over Eastern India have remained one of the most intriguing issues in the study of EVF cultures. Iron and copper have been the central points of attention as well as controversy. In the light of the available database, which is too voluminous to be incorporated with details in the present study (for detailed discussion on the use of metal, see Chakrabarti 1992, Chakrabarti and Lahiri 1996, Tripathi 2005-06: 109-24 and for metallurgical analyses of artefacts from various spatial contexts, see Chattopadhyay 2005), comprise mainly of two categories: productive and non-productive. Even with the productive variety of objects such as implements of different categories the question of their association with farming and non-farming activities (see Table 3). It may be noted here that on the basis of fieldwork at different geographical segments of West Bengal, it has been possible to tentatively locate the iron assemblages in terms of their raw material bearing locales of origin. The following spatial contexts may in this concern be identified:

1. At an early stage, BRW using people at Bahiri might have used the source in form of lateritic belts located in the Mulukerdanga and Khayermath near Santiniketan.

2. In all probability the BRW people of Mangalkote exploited the sources in and around Orgram-Eruer.

3. Pandurajardhibi and Bharatpur had close access to Kanksa-Durgapur lateritic tracts, besides their local patches of deposits, particularly in the slag-bearing sites in the Ayoghya-Bankati-Gopalpur-Arrah areas.

4. The raw materials of Kankordanga-Hatkrishnanagar, Kushadwip-Pandua, Dhansimla-Sonamukhi played an important role for the procurement of iron used by the BRW people of Dihar, Dayalpur, Achhra and neighbouring sites. Similarly, because of the non-availability of local resources, the BRW-iron using people of Pakhanna could achieve the extract iron from the Hatasuria-Barjora area. It is to be noted that all the raw material bearing areas mentioned here contained enough iron slag as supportive evidence.

5. In the context of flourishing evidence of early use of iron — once the know-how of reducing iron from its ore in a very hot, closed fire has been achieved —the result was the production of a far cheaper and much more effective set of tools than bone, stone or copper. Iron tools in quality and quantity, having permanent impact on the economic basis, were not in production before 300 BC as suggested by the findings of Mangolkote.

An analysis of the bone remains from the sites so far studied shows that the Chalcolithic inhabitants consumed both the wild and domesticated species for meats. The domesticated species found at these sites includes humped cattle, buffalo, pig, sheep and goat. The wild species, on the other hand, found at sites like Mangalkote, Bharatpur and Pandurajardhib included different types of deer such as swamp deer (*Cervus duvauceli*), spotted deer (*Axis axis*), and barking deer (*Muntiacus muntjak*), fowl (*Gallus sp.*), Nilgai (*Boselaphus tragocamelus*), wild cattle (*Bos namadicus*), wild rat (*Rattus sp.*), wild dog (*Canis aureus*) etc. The aquatic resources from these sites included remains of fishes (mostly of the *Teleostean* variety) and turtles (mostly the species like *Batagur baska, Lissemys punctata* and *Trionyx gangeticus*). Baneswardanga has also yielded the evidence of the use of fishes and soft-shelled turtle and some species of molluscs. Some amount of bones of wood pigeon (*Columbia sp.*) from Mangalkote and Pakhanna not only indicates their use as food but also reflect use of their feather in staining and pigmentation of ceramics. Occurrence of bones of birds from Pakhanna suggest exploitation seasonal migratory species like river swan and different varities of duck. Similarly, Tulsipur may be cited as an example for the consumption of fowl at a mass scale, particularly in light of the fact that the region has a long tradition of animal husbandry. On the whole, the presence of commendable percentage of wild species in the faunal remains unearthed from major excavated sites like Bharatpur, Pandurajardhibi and Mangalkote (Datta 2005:41-7) may suggest that essentially non-farming activities such as big and small game hunting, fishing and fowling occupied a major area in the overall subsistence strategies of the EVF people at an early stage of their genesis. Rice is also found scattered over the second floor level of Period I at Mahishdal. Rice found from the granary at the site was of a slender variety similar to the modern fine grained species. The palaeobotanical study and the pollen analysis identified the remains of wild (*Oryza rufipogon*) and cultivated (*Oryza sativa*) strains of rice within the charred rice grains. From Pakhanna the remains of *Oryza sativa l.* (rice), *Vigna mungo* (black gram) and seeds of *Brassica campestris l.* (mustard) have been discovered from Chalcolithic and early historic periods. It is significant in the context of occurrence of wild crops that during field surveys different species of wild cereals/crops are still in existence in parts of Western Barddhaman, Bankura and Purulia. Some of the commonly noticed types, as they are locally called, are: *kuta, jhora, urki, karma, dogla, lausa, rohi, kalchi* and *rogon*. Such wild cereals still play a major role in the daily dietary habits of some sections of rural people. It is likely that a rural woman did much near-at-hand food collecting/ harvesting of wild species as they still do in parts of rural Bengal. The entire above mass of date is a clear indicator that people were learning to utilize a far greater variety of resources within the environmental niche and exploiting the local biota.

Terracotta objects have been found in profound quantity from many of the excavated sites of Eastern India, particularly West Bengal. A general review of artefacts from sites like Pandurajardhibi, Mahisdal, Bharatpur, Mangalkote, Bahiri, Baneswardanga, Pakhanna and Dihar (Table 4) attests extensive evidences in the form of terracotta balls, net sinkers, hop-scotches, spindle whorls, beads, miscellaneous game objects, terracotta discs, figurines etc.

The above summary of material assemblages is not an exhaustive one. There are several miscellaneous objects recovered from excavated/explored sites reflecting subsistence economy of the early village farmers of Eastern India as a whole and Bengal in particular.

Observation

On the question of chronology and gradual development of EVF societies, our available archaeological records might throw some light on the stages of development of economic patterns from the period of formation to that of maturity. The occurrence of metal — both copper and iron — has often been taken as one of the diagnostic indicators of the development of such processes. But once we take into consideration the archaeological contexts of their occurrence, the productive and non-productive characters of the assemblages might become quite apparent. In the formative phase of the early village cultures of the Chhotanagpur plateau and its adjoining alluvial parts of the lower Ganga valley, it is very difficult to visualize the usages of metal as a pre-requisite of the development of EVF culture and economy. This stage of development can be seen at sites like Pandurajardhibi in West Bengal, Golabai Sasan in Orissa and Chirand, Senuar and Taradih in Bihar. One has to bear in mind that in many cases such developments are only parts of a potential progressive pattern determined by the prevalence of hunting-fishing-food collecting/harvesting and even incipient stage of food production. Consistent availability of metal in many of the BRW bearing sites at a slightly later stage of development may be linked with the second stage of development of the EVF cultures of Eastern India. Although metal, particularly iron, occurs in many such contexts, the utility of such materials in productive and more particularly farming activities requires further investigation. Occurrence of iron in association with pottery at Bahiri, for instance, deserves a fresh review. Appearance of malleable iron slag from many sites may be explained in two different ways: (a) as leftover of earlier durable materials that have disappeared form their primary context, due to continuous recycling and reuse (b) in the form of malleable iron (as slag or nodules) that emanated out of the enormous heat generated in the oxidized atmosphere of the potter's hearth. Tringham has shown similar evidences with copper in the context of Eastern Europe (Tringham 1971: 195-205). The probability of this context is enhanced when the site locates itself in a lateritic landscape, as with the case of Bahiri. The third phase of development can be viewed in terms of the occurrence of productive metal in association with BRW in mature EVF villages. Here again, one might rethink about the extent to which these metallic components were used in farming operations and their functional contributions, on the other hand, in the non-farming sectors of the subsistence economy. Late occurrence of metal along with stereotyped BRW pottery reflects an amalgamation of the historical elements of culture with the EVF economy and almost the entire Kumari-Kangsabati as well as Bhairavbanki-Tarafeni complexes of sites may be taken as the most suitable example for this phase of adaptation and continuity.

In associating structural materials with the over all growth of EVF cultures, three broader categories might be reflected: (a) mud structures (with wattle-and-daub) forming the main superstructure; (b) roof of structures made with beams of split palm-logs or locally available wood; and (c) reed/cane (*hogla/sar*) structures as unearthed from stratified contexts at Bahiri. The structural assemblages may be spatially divided into the outer and the inner complexes. One of the best examples of these categories comes from the mound of Bhairabdanga at Pakhanna. The inner complex may in turn be further divided into sub-blocks of core and the periphery. The outer complex, on the other hand, could be visualized in terms of classified organization of space into the 'private' and the 'public' places. The public category of structural evidence that we come across in a fragile state at Pakhanna comprises of communal functions related to group activities. The private structure, common to many excavated sites, includes rooms that form the basic unit within the settlement and the subsidiary structures, *i.e.* stores, pens, kitchens and workshop areas, which were directly related to the primary house structure. Domestic architecture throughout the study area is square/ rectangular in plan and five categories of functional-spatial components may be broadly recognized: (a) living area, (b) storage area, (c) livestock area including those for accommodating fodder, (d) courtyard and (e) industrial area. The overall settlement suggests of effective food production.

The subsistence pattern and the contexts of sites in the background of their developmental phases have to be viewed in the light of locations of settlements as has already been stated. In many of the cases, location and spatial composition of a site are governed by seasonal differences in the nature and frequency of resources in accordance with changes in the *floral and/or faunal regime*. On the basis of fragmented evidences in the form of cultivated cereals, root crops and fibres, faunal remains, midden samples and large amount of aquatic animals like turtles and fishes recovered from habitation areas, one can formulate the strategies of subsistence. Harvesting of honey and procurement of wine from plum (*Borassus flabelifer*) and *mahua* (*Bassia latifolia*) must have formed a major means of survival for farming-non farming worker groups. Unfortunately scientific studies on the identification of bio-molecules in pottery assemblages have not so far been undertaken in archaeological researches. In some cases, however, due to the recovery of materials from refuse/ dump areas, it becomes difficult to understand their relationship with the patterns of consumption. In our opinion, the alluvial tracts of the deltaic formations between the middle of the second and the first millennia BC witnessed a steady growth of agro-pastoral economy. The intensive exploitation of marine resources by the hinterland sites like Mangalkote and Tamluk (in West Bengal) and Golabai Sasan (in Orissa) close to the coastal areas, might throw some light on off-shore fishing. Continuous changes in the coastline and the resulting flow of tidal water brought home enormous provision for absorption of different species of aquatic resources. This process of continuous absorption is also responsible in reaching the climax of ocean navigation reflected in the ancient literary sources, roughly from the early centuries of the Christian era.

The presence of stone tools (specialized in grinding) for milling activities at least at an early level indicates that technology for processing of earliest domesticates was in existence for some time prior to first evidence of its intensive use in the milling of wild cereals along the river valley. The occurrence of ground and polished milling tools at the site of Barudih in Singhbhum seems to be significant. In this context occurrence of BRW along with such evidences at the site clearly reflects the exploitation strategies involving use of stone tools in both wood working within a local frame and the supply of milling tools in extra-local contexts. Chakrabarti has rightly observed in the context of Barudih that a site "which show[s] as assemblage of iron slag, at least one iron implement and black-and-red ware alongwith microliths and a large number of neolithic celts cannot be called [a] neolithic site" (Chakrabarti 1993: 201). One may further observe that once the level of the effective village farming had been established, however, things did begin to move further, but not rapidly; by the last centuries of the second millennium BC the descendants of the first villagers had developed plough agriculture in the flood plains with the help of ploughshare made of wood. It is relevant here to note that *babla* (*Acacia nilotica* and *Acacia arabica* of the *Liguminaceae* family) is still a very useful wood for preparing ploughshare. The effective use of stone tools in the production processes of such wooden apparatus is highly contextual when one looks at their occurrence as parts of an archaeological assemblage. Apart form the above, the theme related to procurement process and transaction of finished products and raw materials in EVF societies, besides other daily commodities, is very significant that demands separate research.

The discoveries of the South Bihar plains emphasize the fact that the Late Stone Age hunter-gatherers of the Chhotanagpur plateau and the its eastern fringe areas in Jharkhand and West Bengal gradually adopted the knowledge of sedentism, the usages of ceramics and farming — in supplementation of their surrounding natural resources. 'Broad Spectrum' exploitation of resource-bases, at this stage, is characterized by a stronger dependence on water resources with settlements clustering in flood plain areas of Ajay-Damodar and Darakeswar. Obviously it is a single line of development that extends from the middle Ganga valley through the South Bihar plains to the lower Gangetic Bengal. Therefore, the large scale agro-pastoral villages of the mature phase are likely to have come into prominence through the South Bihar plains that acted as the sole buffer area in the processes of cultural transformation and village formation.

The spread of BRW associated village farming cultures of the Gangetic delta by the first farmers is thus a result of (1) the probable movements of such populations, mainly farming groups, from the middle Ganga valley, (2) the spread of ideas and things beyond the middle Ganga valley itself, and (3) the adaptation of ideas and artefacts by the indigenous forest folks of the Chhotanagpur plateau, adjoining South Bihar plains and the lower Ganga valley. The patterns of 'receptiveness' of the practices can be visualized as a slow process of mode of production, although hunting/fishing and food collecting still remained a part and parcel of their day-to-day survival strategies. Here it has to be mentioned that the people of the region were not 'slavish imitators'; they adopted ideas and practices from the mainstream cultural milieu of the Ganga valley into a new and organic whole capable of developing its own original lines of maturity.

SITE	OBJECT	CHRONOLOGY	PROBABLE FUNCTIONS
Pandurajardhibi	Spearhead, points, awls, points, pins, bangles, antler fragments, tanged and socketed split bones	Periods I and II	Mostly domestic with specimens highlighting painting activities; for making incision on pottery and hunting
Mahisdal	Pins, fragments of a decorated comb and bangles	Period I	Non-productive decorative functions as well as hunting
Bharatpur	Bone combs, bone bangle, points, tanged points, bone harpoon	Period I	Clearly reflecting large scale fishing activities, besides domestic usages
Mangalkote	Awls, points, pins, daggers, arrowheads, shafts, lunates (?) swords, knifes scraper, blades, decorated bone combs	Periods I and II	Hunting & foraging implements predominate, though objects of domestic use are also not rare
Bahiri	Tools like awls, points and arrowheads and on splintered bones and antlers, numbering 33	Period I	Mostly reflecting small game hunting as part of the basic survival strategy
Baneswardanga	Four out of five tools were made on split bone, one arrowhead made of antler	Five specimens from Period I and nine from Period II	Boring and sewing implements, besides hunting tools
Pakhanna	Points, arrowheads, scrapers	Period I (Bhairabdanga)	Probably hunting tools
Dihar	Large number of artefacts like points, spearhead, needle, drill, stylus, picks, different types of scrapers	Period I	Mostly hunting tools, some reflecting sewing activities including leatherwork (specifically the needles)

Table 1: Nature of bone and antler artefacts from major excavated sites in West Bengal

SITE	OBJECT	CHRONOLOGY	PROBABLE FUNCTIONS
Pandurajardhibi	Some short of microlithic tools like point cum scrapes, spearhead, flakes, points, cores, blade-burin, parallel sided blades; polished stone celts, saddle-quern, a household amenities broken pestle; beads of agate, chalcedony and jasper and steatite	Periods II and III	Mostly reflecting hunting-fishing activities; milling, harvesting and woodwork; luxury
Mahisdal	Large quantities of microliths including scrapers, points, lunates, short blades; beads of steatite and other semi precious stones	Periods I and II	Hunting-fishing activities; household objects
Bharatpur	Profuse number of microliths including fluted core, waste flakes, scrapers, lunates, borer, points, short blades; tiny polished stone celts; beads of steatite and other semi precious stones	Period I	Hunting activities and milling operations beside use in farming
Mangolkote	Microliths including few cores and two pieces of blades; a huge stone pestle; beads of agate and carnelian	Period I and II	Same as above
Bahiri	Six pieces of semi precious stones like agate, carnelian, quartz; some natural pebbles and pieces of igneous rocks	Period I	Extensive fishing and hunting activities; domestic uses
Baneswardanga	Microlithic tools including cores, flakes, borers, points, blade, backed blade, parallel sided blade,Lunate, tranchet; a muller; beads of chalcedony, carnelian, agate and faience	Period I, II and III	Mixed hunting-foraging-fishing as well as harvesting
Pakhanna	Microliths; polished stone tools; beads of semiprecious stones; stone balls; grooved stone	Periods I and II (Satbardanga and Bhairabdanga)	Milling activities and ornamental uses; extensive fishing
Dihar	Microliths in limited numbers including small parallel sided blades, side scrapers, end scrapers, thumb nail scrapers, lunates, points , fluted cores; beads of carnelian, chalcedony, agate, jade, greenstone, amethyst and crystal	Period I	Same as above

Table 2. Nature of stone artefacts from major excavated sites in West Bengal

SITE	OBJECT	CHRONOLOGY	PROBABLE FUNCTIONS
Pandurajardhibi	Copper objects include nails, fish hooks, antimony rods, bangles, rings a tubular bead, arrowhead , bangles, rings, eye pencil, fish hooks, iron objects include slag, broken sword, celt, arrowhead, points, blades, sickle, spearhead, slag and crucible; Gold pellets and pins.	Periods II and III	Domestic daily and luxury uses; fishing, hunting, harvesting and a few related to farming
Mahisdal	Copper slag, fish-hooks, pieces of bangles, rings etc; iron objects include arrowhead, spearhead, nails, chisels besides a large quantity of iron ore and slag	Period II	Same as above
Bharatpur	Copper fishhook	Periods I and II	Intensive fishing
Mangolkote	Copper bangles, beads, stylus and ring, awl, hook, point; Iron objects including arrowhead, point, spearhead, dagger, sickles, hoe, points, chisels	Period I and II	Domestic daily and luxury uses; fishing, hunting, harvesting and a few related to farming
Bahiri	Copper in negligible quantity; profuse number of iron slag	Period I	Not discernable due to lesser frequency of artefacts
Banesvardanga	Copper beads, copper pellet, fragmentary copper bangle; iron spearhead or sword, profuse quantities of iron slag	Period III	Non-productive usages
Pakhanna	Copper rings; iron slag, chisels, arrowheads.	Periods I and II (Satbardanga and Bhairabdanga)	Hunting, fishing woodwork and domestic use
Dihar	Copper beads, antimony rods.	Period I	Domestic use

Table 3. Nature of metal artefacts from major excavated sites in West Bengal

SITE	OBJECT	CHRONOLOGY	PROBABLE FUNCTIONS
Pandurajardhibi	A terracotta seal, several terracotta mother goddess figurines, two terracotta hollow heads, terracotta balls, net sinkers, hop-scotches, an oblong quern.	Periods II and III	Fishing and decorative usages
Mahisdal	A small but realistic phallus, tetrahedral objects, terracotta gamesmen, broken part of a terracotta elephant,	Periods I and II	Same as above (objects of entertainment)
Bharatpur	Net-sinkers, spindle whorls	Periods I and II	Same as above
Mangolkote	Terracotta animal figurines, net sinkers, spindle whorls, terracotta balls, discs, bangles and T.C. beads.	Periods I and II	Same as above
Bahiri	Terracotta head of an animal; terracotta discs; spindle whorls	Period I	Same as above
Banesvardanga	Terracotta sealing, hop-scotches, beads, spindle whorls.	Period I and II	Same as above
Pakhanna	Profuse quantity of net-sinkers, spindle whorls	Periods I and II	Same as above
Dihar	Terracotta beads, net sinkers, spindle whorls, stopper, play cartwheel etc.	Period I	Same as above

Table 4. Nature of terracotta artefacts from major excavated sites in West Bengal

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Flogging a Dead Horse

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Background

An old joke dating back to the Cold War goes like this: Nixon visits the USSR and challenges Brezhnev to a race in one of Moscow's parks, just the two of them; of course, a fitter Nixon wins easily. The next day, the *Pravda* (a word meaning "truth" in Russian) opens with a big headline: "Brezhnev brave second; Nixon next to last." Factually correct, yet rather tendentious in what it chooses to highlight and to conceal.

Purely coincidentally, we find this selective use of "truth" in frequent use in Marxist[1] historiography in India. A case in point is Prof. Ram Sharan Sharma's "Was the Harappan Culture Vedic?" reproduced in the Debate column of *JISHA*'s last issue.[2] In a short space, Sharma crams pell-mell arguments which he clearly regards as devastating, leaving no one in doubt about the truth of the good old Aryan invasion / migration theory, which dictates that Harappan culture must be pre-Vedic, since the Aryans entered the subcontinent a few centuries after the demise of the Harappan civilization.

However, on closer scrutiny, Sharma's points are anything but compelling. I propose a few counterpoints to illustrate the generous use he has made of the *Pravda* method.

The Vernal Equinox

With characteristic ideological élan, Sharma starts by asserting that astronomical arguments for a remote date of the Rig-Veda based on mentions of the vernal equinox are "fundamentalist" (a barb thrown at the archaeologist Prof. B. B. Lal); Sharma assures us that "modern astronomers ... state 'the equinoxes are not mentioned in the *Brahmanas*'."(Sharma 2004:135) However, the "modern astronomers" referred to[3] (D. M. Bose, S. N. Sen, and B. V. Subbarayappa, who are not astronomers but historians of Indian science), actually imply the very opposite in their excellent study: in a scholarly chapter on ancient astronomy, S. N. Sen demonstrates that the Brahmanas are aware of solstices and equinoxes, and clearly refer to a time when the *Krittikas* (Pleiades) coincided with the vernal equinox. Here is the full sentence mutilated by Sharma:

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Although the equinoxes are not explicitly mentioned in the *Brahmanas*, the coincidence of the vernal equinox with the *Krittikas* has been inferred from the fact that this *nakshatra* was at the head of the asterisms in the time of the *Brahmanas* and from the fact that when the vernal equinox shifted, through precession, to the *nakshatra Ashvini*, the latter became the head of the *nakshatras*. The *Brahmanas* also contain the important statement that the *Krittikas* never deviate from the east, which must have been the case when this *nakshatra* marked the intersection of the ecliptic with the equator.(Bose *etal.* 1971:77)

This intersection of the ecliptic with the equator is called the "vernal point" and is the point occupied by the sun at the vernal (or spring) equinox. Why is this so important? Because, owing to the precession of the equinoxes, which takes place over a 25,800-year period, each of the 27 *nakshatras* stays near the vernal point for almost a millennium (25,800 divided by 27). The *Shatapatha Brahmana* (2.1.2.3) notes, for instance, that "the *Krittikas* do not swerve from the east, while other constellations move away from it." This unambiguously records a time when the *Krittikas* were near the vernal point, which happened between 3200 and 2200 BCE. Yet, if the Aryans entered India around 1500 BCE, the *Shatapatha Brahmana* could only date from 1000 BCE at the very earliest — a whole millennium and a half *after* the recorded position of the *Krittikas*. That the *Shatapatha Brahmana*'s statement is not a freak occurrence is confirmed by the fact that the *Krittikas* head various lists of the 27 *nakshatras* .(Bose etal. 1971:66-68)starting from the Yajur-Veda, then move to the second position in the *Vedanga Jyotisha* (dated around 1300 BCE), finally to the first in a historical text such as the *Surya Siddhanta* — a perfect reflection of the movement away from the vernal point, owing to the precession of the equinoxes.

This astronomical evidence is so strong and internally consistent that, had it not been for the dogma of the Aryan invasion, it would have been accepted long ago. It is no surprise, therefore, that Sharma prefers to distort the picture and to throw invectives rather than engage in a dispassionate discussion of the positive evidence. If to follow the self-evident testimony of Vedic astronomy is "fundamentalist," we must await with bated breath from Sharma an enlightened, coherent model to interpret all astronomical references from the Samhitas, the Brahmanas and the *Vedanga Jyotisha*; strangely, no Marxist scholar has ventured to do so, to my knowledge.

The Rig-Vedic Pur; Rig-Veda and Urbanism

Sharma goes over the old issue of the Rig-Veda's *pur*, those apparent settlements, sometimes called "forts," of both the Vedic people and their adversaries. Sharma's view is that the *pur* "was either a dwelling unit or a cluster of such units which appeared in the post-urban Harappan phase," although a little later he connects *pur* with "large buildings of about 2000 BC found in the Bactria-Margiana Archaeological Complex"(Sharma 2004:138) — clearly, the rishis did not mind contradicting themselves. Sharma then brings in George Erdosy, who, he quotes, regards "renewed insistence on equating the Rigvedic and Harappan civilizations" to be "eccentric assertions."[4] Again the *Pravda* method at work: this remark is actually part of a longer statement in which Erdosy regrets that the works of "a considerable number of Indian scholars [who] always rejected the traditional (and Western) view of Aryas as an alien, invading race" were prevented "from gaining the attention they deserve," (Erdosy 1994:224) an attention that Sharma is clearly out to deny.

Worse, Erdosy's fine paper is actually a detailed examination of most passages of the Rig-Veda dealing with "*pur*"; his conclusions are as opposed to Sharma's as possible. For Erdosy, *pur* does not refer to a physical dwelling: *pur*'s "primary aim was to guard against spiritual ills and magical practices ... the 'forts' belong to the realm of mythology." (Sharma 2004:138) Still worse, and again glossed over by Sharma, is Erdosy's identification of Dasas and Dasyus with demons, not dark aborigines, and of the Arya-Dasyu fight with "a cosmic struggle," (Erdosy 1994:232) not a conquest of indigenous tribes by invading Aryans. It is hardly surprising that Sharma should be silent about Erdosy's findings, since his reading of the Rig-Veda is broadly the colonial one, which gave flesh and bones to the "enemies" of the Aryas and started off a desperate but vain quest for physical traces of the mighty conquest.[5]

A related aspect of the question is whether or not the Rig-Veda is aware of cities and urbanism, as we might expect it to be if Harappan culture were Vedic. This is an old debate, and Sharma adopts the conventional standpoint that since the Rig-Veda knows neither bricks (*istaka*) nor cities, it must be post-Harappan. The argument, so clinching in appearance, is in reality deeply flawed. Firstly, because the Vedic rishis have never laid down a promise to describe or include each and every item of their environment; strictly speaking, the non-mention of one item *in isolation* proves nothing. Secondly, because even if we accept that they knew neither bricks nor cities, then we should logically be pointing to pre-Harappan times, since around 1200 BCE, the date first proposed by colonial Sanskritists and Marxist scholars for the composition of the Vedic hymns, there would have been plenty of Harappan bricks lying around in abandoned or ruined settlements (and some of the still occupied Late Harappan sites); the Aryans could not but have made use of them, especially along the Sarasvati, where the density of Harappan settlements was so high.

The only way to treat the Rig-Veda's testimony on its environment is to look at a far longer list of items together. For instance, the Rig-Veda does not mention cotton or rice or wheat or iron; if we look for a period that reflects ignorance of those items as well as of the brick, the pre-Harappan one again suggests itself naturally, since all those items were positively present and in use in mature Harappan and post-Harappan times. Moreover, a pre-Harappan Vedic origin meshes particularly well with the astronomical evidence, since we must allow several centuries, at the least, between the Rig-Veda and the *Shatapatha Brahmana* which, as we have seen, records an astronomical event of the third millennium.

Another point made by Sharma, an oft-repeated one, is that "the mature Harappan culture was basically urban, marked by crafts and commerce, in contrast to the early Vedic culture which was rural and pastoral." (Sharma 2004:138) This is one more well-turned paradox which seeks to dull the hearer's cognitive faculties. However, it really proves nothing: let us observe today's Delhi and its "urban culture" and contrast it with the "rural and pastoral culture" of interior Bihar or Madhya Pradesh; are the two compelled to belong to different epochs? Can they not coexist? If the Vedic rishis lived in Harappan times, were they compelled to live in the big cities and to record for posterity descriptions of their hustle and bustle? Could they not have kept their ashrams in the countryside or the hills?

But the urban vs. rural paradox is misleading on more serious grounds, especially in the assertion that Harappan culture is "urban." In reality, only a small proportion of the sites were sizeable towns or cities; moreover, most Harappan designs relate to bulls, horns, elephants, tigers, buffalos, peacocks, trees, fishes, crocodiles, etc. — not exactly what we would today call "urban art." It is a truism that the Harappan world was both urban and rural. Then, was the Veda so exclusively "rural and pastoral" as we are told? Yet another old debate, and the answer could be summarized as, It depends how you decide to read it. A Marxist scholar, Bhagwan Singh,[6] recently saw in the Rig-Veda the opposite of what Sharma sees: trade and industry and urbanism and elaborate governance; without going to such an extreme, a proponent of the Aryan invasion, B. K. Ghosh, felt compelled to observe in 1958 that "the Rgveda clearly reflects the picture of a highly complex society in the full blaze of civilisation".[7] We are far from the picture of a primitive, pastoral Aryan clan. Sharma's "contrast" works only by greying things on one side and adding colour on the other.

And of course by concealment. For he takes care not to remind his reader of the numerous common points between Harappan and Vedic culture: the bull, the swastika, the trishul, the pipal, deities in yogic posture exuding self-mastery, fire worship or animal sacrifice. Nor does he mention the numerous survivals of Harappan culture in historical times, such as identical series of weights (which he cheerfully calls "accidental similarities" elsewhere)(Sharma 2001:48), agricultural or metallurgical techniques, symbols such as the endless knot, games (proto-chess, dice), conch shells for pouring or blowing, the *anjali namaskar*, ritual bathing, and much more.[8] Why this strange silence on powerfully suggestive bridges between prehistory and history?

Hydronymy

Sharma seeks to deal another mighty blow by pointing out that "pre-Aryan river names have survived" in the North-West of the subcontinent, and mentions, on the authority of linguist Michael Witzel, the examples of Kubha (today's Kabul), Krummu (the Kurram) and even Ganga. He also refers to Witzel's endorsement of F. B. J. Kuiper's identification of 300 non-Aryan words in the Rig-Veda, mainly Dravidian or Munda. Ergo, the Aryans perforce came from outside: "Most probably Dravidian words percolated to the Vedic language through the remnants of the Indus culture." (Sharma 2004:139) Further proof of this assertion is the old argument based on the presence of Brahui, a Dravidian language, in the region.

Here too, once we scratch the brilliant surface, a very different picture appears. There is, to begin with, absolutely no sure way to decide whether a word root is, in the last analysis, Aryan or Dravidian or Munda. After two centuries of debate, linguists cannot agree which of these three linguistic families the word *mayura*, for instance, belongs to. As a result, there has been no consensus among linguists on the Rig-Veda's supposedly non-Aryan words: T. Burrow proposed some 500 words, Kuiper 380, Witzel 100, Murray Emeneau just one, and P. Thieme none at all. While Burrow and F. C. Southworth traced their non-Aryan vocabulary to proto-Dravidian, Witzel plumped for para-Munda, arguing that words of Dravidian origin are found only in the later layers of the Rig-Veda; yet others have bravely sought to identify a lost, pre-Aryan "language X." Emeneau was honest enough to admit that all proposed word loans from proto-Dravidian into Indo-Aryan "are in fact merely 'suggestion' and their etymologies are "in the last analysis unprovable, are 'acts of faith'."[9] More recently, H. H. Hock questioned all supposed borrowings, finding them unconvincing.[10] We are very far from Sharma's laughable description of Vedic Sanskrit as "a mixture of Munda and Dravidian words with the Indo-Aryan language"! (Sharma 2004:142)

In other words, the linguistic evidence to be drawn from the Rig-Veda is, at best, very weak, and, in any case, completely neutral. For if there were indeed a few words of non-Indo-Aryan roots, why should they necessarily belong to a *pre*-Vedic layer? Which language exists in perfect isolation? Even if we assume a Harappan or pre-Harappan chronology for the Rig-Veda, there would have been no law to stop its composers from absorbing some vocabulary from neighbouring regions.

On the other hand, Sharma speaks of an "almost total substitution of pre-Indo-Aryan river names by those of Indo-Aryan type" (Sharma 2004:136) in the

North-West. This is another misrepresentation: in actual fact, most scholars recognize that the hydronymy (river names) of the North-West is almost entirely Indo-Aryan: some 35 rivers, not one or two, have Sanskritic names. But why call it "substitution" at all? How do we know that those rivers ever had "pre-Indo-Aryan names"? What Sharma conceals from us is this: the world over, hydronymy is one of the most unchanging linguistic features; most European rivers (Rhine, Danube, Rhône, Thames ...) bear pre-Latin names, despite the massive linguistic and cultural influence of the Roman Empire; even America has preserved many pre-colonial river names (Mississippi, Missouri, Mohawk, Potomac ...) despite the crushing impact of European conquerors. An almost wholly Indo-Aryan hydronymy of India's North-West, if it were a "substitution" by conquerors as Sharma tells us, would be unprecedented in human history; it would imply a devastating conquest, a total and brutal erasure of the preceding culture. Although that was indeed the common fancy of nineteenth-century scholars, there is, as we now know, strictly no sign of this on the ground. In exact contradiction with Sharma's point, the North-West's hydronymy is one of the strongest arguments against the Aryan invasion or migration.

As regards the old Brahui argument, it is another excellent example of "leapfrog logic," to paraphrase R. Tringham. How does the presence of a Dravidian language in the region prove that it was there *before* Indo-Aryan languages, and that the latter came through a migration? Sharma clearly feels under no compulsion to examine the many alternative explanations. But linguists did so: as early as in the 1920s, Jules Bloch studied the Brahui vocabulary and concluded that this language reached Baluchistan recently, probably at the time of Islamic invasions through a migration of Dravidian speakers from Central India.[11] More recently, the well-known Dravidian linguist Murray Emeneau[12] reached similar conclusions; those were endorsed by H. H. Hock[13] and Josef Elfenbein.[14] In other words, the presence of Brahui in the region is of no relevance whatsoever to the Aryan problem. It is little wonder that Sharma tells us nothing of the findings of those scholars.

Flora and Fauna

Sharma then tries his hand at flora and fauna, asserting that "the plants and animals are different in Rigvedic and Harappan cultures." (Sharma 2004:137) He proceeds to explain that *pipal* and *nim*, sacred to the Harappans, are non-Indo-Aryan terms — but assuming it to be true, how does that concern us? How do we know what those trees were called in Harappan language, in any case? What does matter is that the peepal (*Ficus religiosa*) was sacred to the Harappans indeed, and was equally sacred to the Rig-Veda, where it is called *ashwattha*.[15] Indeed, it is one more among the many bridges between the Harappan and the Vedic worlds.

All animals and plants presented by Sharma are similarly mishandled. To take just two cases (with that of the horse coming a little later), he assures us that the Harappan unicorn is unknown to the Rig-Veda; how does he know? The unicorn is clearly an emblematic animal, and without even attempting to read its symbolism, such a conclusion is a non-sequitur. The Rig-Veda is replete with references to horns and of deities "sharpening their horns," sometimes in the singular; elsewhere I have proposed a correlation with the Harappan unicorn on the basis of several such suggestive passages.[16] Or Sharma mentions the elephant, represented in Harappan art, but "not important in the earliest Veda"; again, how does he decide this non-importance, when the Rig-Veda mentions the animal about ten times, mostly as a symbol of wild power? And how do we know what it represented for Harappans? We touch here the central problem with Sharma's approach: rather than attempt to build a rigorous method, catchy contrasts, relevant or not, are constantly resorted to.

In fact, his favourite target, B. B. Lal, did propose recently a method to deal with the question of flora and fauna, in a study built on identifications supplied by the respected archaeobotanist K. S. Saraswat.[17] Lal documents that the Rig-Veda mentions thirteen plant species and seven animal ones, all of which belong to a tropical environment and are found in India's North-West. If the Vedic hymns were composed by the Aryans a century or two after they arrived in India, how do we explain that they failed to remember a single plant or animal from the colder and harsher climate of their supposed "original homeland"? Can there be a more amnesiac clan, since it also failed to leave in the Veda the faintest allusion to their epic migration to and conquest of Northwestern India? While Lal's analysis may not be the last word on the question, it does rely on a coherent method and body of evidence.

Genetics

Sharma then shares with us "the latest view based on DNA data," and informs us that a DNA marker "defined the first major wave of Dravidian migration into India." (Sharma 2004:139) Moreover, quoting Spencer Wells,[18] Sharma opines that the M17 marker establishes that "the Indo-Aryans migrated from Central Asia to India. They place this process after 8000 BC. But linguists and archaeologists place it around 2000 BC."(Spencer 2002:142) We have here a fine hybrid of misrepresentation and confusion (leaving aside the slight gap of just six millennia).

Misrepresentation, because most archaeologists today have criticized or rejected the old Aryan migration theory, including Colin Renfrew, Jonathan Mark Kenoyer, Jim Shaffer, Jean-François Jarrige and, of course, many "fundamentalist" Indian archaeologists (why foreign archaeologists are unfairly denied the colourful "fundamentalist" label passes my understanding). And because linguists have no way to set dates; indeed a recent linguistic study has sought to push the origin of the proto-Indo-European language beyond 8000 BCE.[19]

Confusion, because after the disaster of Nazi ideology, which erected its ideal of an Aryan "master race" on the tragically erroneous racial myths of the nineteenth century — myths nurtured by linguists and mythologists as much as by anthropologists — proponents of the Aryan invasion / migration theory loudly declared that henceforth their Aryans and Dravidians were purely linguistic entities, with no racial or even ethnic connotation. Why, then, is Sharma searching for genetic proofs of the arrival of "Dravidians" and "Aryans"? Have those linguistic entities suddenly reverted to racial ones? Or else, is language built into one's DNA? It is pathetic to note how this long discredited conflation of race and language lurks at the back of almost every invasionist mind.

What genetics can tell us, however, is whether a significantly numerous ethnic group entered India in, say, the second millennium. Note that in Sharma's view, "the Indo-Aryan immigrants seem to have been numerous and strong enough to continue and disseminate much of their culture," (Sharma 2001:52) so theirs numbers are not in doubt. In the last few years, Wells's conclusions quoted by Sharma have been seriously challenged by many geneticists, such as Toomas Kivisild, T. R. Disotell, Richard Villems, Stephen Oppenheimer, P. A. Underhill, and, on the Indian side, Sanghamitra Sengupta, Partha P. Majumder, or V. K. Kashyap, among many others.

As I have summarized their important findings elsewhere,[20] I will not cover the ground here, but will merely recall their major conclusion that "the supposed Aryan invasion of India 3,000-4,000 years before present ... did not make a major splash in the Indian gene pool."[21] For Oppenheimer, results were clearly "undermining any theory of M17 [referred to by Sharma] as a marker of a 'male Aryan invasion' of India. One average estimate for the origin of this line in India is as much as 51,000 years. All this suggests that M17 could have found his way initially from India or Pakistan, through Kashmir, then via Central Asia and Russia, before finally coming into Europe."[22] In other words, the direction of the migration is exactly in the opposite direction, and it goes back some 50 millennia. Kivisild et al. agree "that there are now enough reasons not only to question a 'recent Indo-Aryan invasion' into India some 4000 BP, but alternatively to consider India as a part of the common gene pool ancestral to the diversity of human maternal lineages in Europe."[23]

Another important conclusion is the absence of a genetic marker for Brahmins, the supposed descendants of the imaginary Aryans: South Indian Brahmins, for instance, are closer to South Indian tribals than to North Indian Brahmins. And to cap it all, some Dravidian-speaking tribes of Andhra Pradesh are genetically much closer to Central Asian populations than are Brahmins and Punjabis! What emerges is a complex picture which is not only incompatible with an Aryan migration, but also shows India's North-West as a crucial region, "an incubator of early genetic differentiation of modern humans moving out of Africa."

As far as the Aryan invasion theory is concerned, let us note that the above findings of genetics precisely confirm those of anthropology: we are now familiar with the work of U. S. anthropologists Kenneth Kennedy, John Lukacs and Brian Hemphill, based on the examination of hundreds of skulls and skeletons from the Indus-Sarasvati civilization and other regions of the subcontinent.[24] Their chief conclusion is that there is no trace of "demographic disruption" in the North-West of the subcontinent between 4500 and 800 BCE; this again negates the possibility of any massive intrusion, by so-called Indo-Aryans or any other population, during that period, which explains Kennedy's persistent opposition to the Aryan invasion myth.

Why is Sharma silent on such important findings?

The Vedic Horse

The final point I wish to take up is that of the horse, because there can be no better illustration of the Pravda method at work. The argument seems final and impregnable at first sight: "the Vedic culture was horse centred,"(Sharma 2004:137)) with the horse described as the instrument of the Aryans' victories, while the animal is unknown to the Harappan civilization, therefore the latter cannot have been Vedic, and therefore the horse was introduced by the Aryans into India.

Unexpectedly, this argument can be turned into the invasionist's Achilles' heel, because it is built on non-sequiturs and concealed evidence, both positive and negative. Here again, I have dealt with the issue elsewhere at some length,[25] and will confine myself to a few chief points, without developing them fully.

1. It is not true that the horse is absent of the Harappan civilization; horse bones and teeth have been found at twelve Harappan sites at least, right from the start of the excavations, and by different teams, Indian and non-Indian. Sharma refers to U.S. archaeologist Richard Meadow's recent work asserting that there were "no osteological remains of the horse before 2000 BC,"[26] but omits the fact that Meadow's work was a failed attempt to convince the late Hungarian archaeozoologist Sándor Bökönyi to change his mind. Meadow was troubled by Bökönyi's report to the Archaeological Survey of India categorically endorsing A. K. Sharma's identification of horse remains at the Harappan site of Surkotada (in Kachchh), and as belonging to the domesticated horse, to boot. Despite a hair-splitting discussion by Meadow, Bökönyi stood his ground. The

debate was inconclusive (Bökönyi passing away before his final reply), and certainly provided little evidence for the "no remains" adduced by R. S. Sharma, especially as it ignored findings of horse remains from several other Harappan sites.

2. The horse was found not only at Harappan sites, but at Mahagara (near Allahabad) by G. R. Sharma et al., with carbon 14 tests ranging from 2265 B.C.E. to 1480 B.C.E., and at Hallur (Karnataka) by K. R. Alur, with dates between 1500 and 1300 BCE. Given the locations of those finds, their dates are entirely incompatible with the conventional view that Aryans brought the horse into India around 1500 BCE.

3. Horse remains apart, contrary to Sharma's assertion; spoked wheels were clearly depicted at several Harappan sites, painted or in relief, as demonstrated by B. B. Lal in a recent work.[27]

4. A few horse figurines have been found in Harappan artefacts, although, admittedly, not too spectacular. However, scantiness of depiction proves nothing: Harappan depictions of the cow, the camel, the wolf, the cat or the lion have not been found so far, yet we know that those animals were part of the Harappan environment. Art is not a zoological catalogue, but follows cultural motivations.

5. Invasionists seem to take it for granted that from the watershed year of 1500 BCE onward, we should be finding horses everywhere in North India. But no such thing is happening: horse remains are as rare after as they were before. Indeed, a number of historical sites report no horse remains — which, according to invasionist logic, could be used to establish that the "Aryans" did not know the animal! Depictions, except for a few sites (such as Pirak, Hastinapura or Atranjikhera) are very few, and become common only in the Mauryan era — the horse is virtually invisible before, which is inexplicable if we remember that invasionists see it glorified in the Veda as an instrument of conquest.

6. Even if we assume that the horse was introduced into India at some time, how do we establish that this was done by so-called Aryans and no one else? Harappans, for instance, were trading all the way to Northern Afghanistan and beyond; it would be very surprising if they never came across horses in the course of their outreach.

7. Just because the Rig-Veda uses the word *ashva* over 200 times does not mean that Vedic society should have been teeming with horses. The late British anthropologist Edmund Leach warned against such a simplistic assumption; his reading of the Rig-Veda was that "in real society (as opposed to its mythological counterpart), horses and chariots was a rarity."[28]

8. In fact, nothing shows that *ashva* in the Rig-Veda always or often refers to the actual animal. Writing several years *before* the discovery of the Harappan civilization, Sri Aurobindo observed that "the word *ashva* must originally have implied strength or speed or both before it came to be applied to a horse"[29] and developed a whole symbolism of the cow and the horse, constantly associated with each other in the Rig-Veda.

9. The validity of this symbolism is strengthened by the fact (a fact never highlighted or discussed, for obvious reasons) that the Rig-Veda makes it clear that the Dasyus and Panis also have horses of their own — rather, have "*ashvas*" of their own.

The whole question of the Vedic horse has been bungled by those and other methodological errors. It is the colonial scholars, again, who misread the Veda and pictured fierce, conquering horse-riding or horse-driving Aryans swooping down on their dark enemies. But the Veda speaks of no such thing. Greek and Egyptian mythologies have long benefited from profound studies into their complex symbolism: why should the Veda be denied such an approach and always be taken at the crudest possible level?

Looking Ahead

There are many more vulnerable points in Prof. R. S. Sharma's paper, but this should suffice. His recourse to misrepresentation and concealment does little to inspire confidence in the inherent strength of the invasionist model: if that is all he can find to oppose the "indigenist" school, then the latter's adherents have ground to rejoice.

What is needed, at bottom, is an entirely fresh look at the problem of the origins of Indian civilization, breaking away from the stereotypes and unsubtle oversimplifications imposed by the colonial-Marxist model (especially when it concludes, as does R. S. Sharma's paper, on a broad hint that the Indo-Aryans probably came from Russia — could he be alluding to Communist Aryans, now?).

We need to rid the Rig-Veda of its dark tribals and semi-drunk rishis fighting over cattle and of its galloping, Hollywood-like Aryans with "Indra!" as their war cry. We need to learn to read Harappan culture at a deeper level, and to grasp the differences as well as interplay between such a popular culture and the Vedic quest. We need to understand the great transition that followed the collapse of its urban context, and to note the numerous points of its reemergence. Perhaps we need, too, a new generation of historians, who will prefer intelligent and civilized debate to *Pravda*-like headlines and wearisome invectives.[30]

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30 It is not an accident but a habit of R. S. Sharma's; see for instance his *Advent of the Aryans in India, op. cit.*, p. 35, and The Indus and the Sarasvati in *Frontline.* 8 May 1998, p. 91. Similar invectives pepper essays by other Marxist historians, such as Romila Thapar or Irfan Habib.

A Preliminary Study of Rock Art of the Western Himalayas

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Anyone interested in the Western Himalayas is well aware of the existence of rock carvings in this area. Without a doubt those of the Upper Indus Valley (Northern Areas of Pakistan) are the most well-known as they are the object of a systematic study. For the last 20 years, rock art sites of the Upper Indus Valley have been published by the Pak-German study group 'Felsbilder und Inschriften am Karakorum Highway' of the Academy of Sciences and Humanities of Heidelberg, Germany (*ANP* and *MANP*).

However, a hundred rock art 'locations' have now been identified in Ladakh (district of Jammu and Kashmir, India) and Western Tibet: 70 in the former (which includes the adjacent valleys of Zanskar, Nubra and Rupshu) and 30 in the later (Rutog district only). The general term 'location' is used purposely and consciously here: it implies that petroglyphs are known at particular places. At the present state of research, without specific topographic studies, the terms 'site', 'concentration', 'point' or 'complex' are not to be used in reference to the rock carvings of Ladakh and Western Tibet (Pl. 1) (On these terms see Francfort and Jacobson 2004: 58).

The present paper shall discuss petroglyphs from these three regions: the Upper Indus valley, Ladakh and Rutog district. The decision to deal with rock carvings from these areas all together results, not only from their belonging to one geographical unit (the Western Himalayas), but also because they enable one to identify a 'cultural unit', which is understood here as the sharing of specific artistic formulae and themes.

The paper will focus on animal and human representations that provide information about Protohistory. Protohistory in Central Asia is, the time-span ranging from the Neolithic period to the integration into a 'literate empire'. The study of the petroglyphs is based on comparisons with rock art from other parts of Eurasia which has been extensively studied (mainly Central Asia and south-Siberia) and with representations on other medium (wood carving, for example).

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The subjects represented in the rock art, but also the way in which they are represented, reveal cultural ties with Central Asia as early as the Bronze Age. After considering petroglyphs from this period, particular attention will be drawn upon animal representations in the so-called 'animal style of the Steppes' that can be dated from the Iron Age, enabling one to fill the gap between south of the discoveries made on the subject in China and Central Asia. The paper will end on a broader view showing the interest of such a rock art study also for the historic period.

Concerning the Upper Indus valley in Pakistan the issue of its relationship with Central Asia has been dealt with in various articles by the late Karl Jettmar (Jettmar 2002, 1991, 1985, 1982 a, b & c). As for the Bronze Age the most representative example of this relation are the so-called 'mascoids' representations of the Okunevo type (the Okunevo culture developed in the Minusinsk basin-South Siberia- and the Altaï) which are cautiously dated from the Early Metal Age (end of the 3rd millennium/beginning of the 2nd millennium BC) (Jettmar 1982b: 300; Francfort 1991: 127). From the Iron Age (1st millennium BC) there are not only engravings, but metal objects, on which decoration is characteristically carried out in the so-called 'animal style' (Jettmar 1982a, 1991). The most well-known example of such an object is a bronze plaque in shape of an ibex, on whose horns the head of a bird is attached, acquired by Jettmar in the Kandia valley and first published in the *Afghanistan Journal* (Jettmar 1982a). The piece is dated, by comparison with bronze objects from the Pamirs, from a period between the 5th-2nd century BC (Jettmar 1982: 87). Mention should be made also of several bronze objects published by Dani in the third edition of his *History of Northern Areas of Pakistan* (Dani 2001, plates and pages 53-63). Those are finds from the Northern Areas of Pakistan collected between 1998 and 2000 (Dani 2001: *addenda*). Among them is an 'arrow head ', said to come from Gas near Chilas. Its handle displays an 'S' topped by an ibex with folded legs and two circular cells marking the body, similar in attitude to the one from Kandia (Dani 2001, pl.: 58/4)

Concerning Ladakh and Western Tibet, a preliminary area of study of protohistoric rock art has been published by Francfort and his colleagues some 15 years ago (Originally Francfort *et al.* 1990, for the English version of the paper see Francfort *et al.* 1992). Through selective engravings they convincingly demonstrated that Ladakh, Zanskar and Western Tibet could be, as well, 'fully related or at least connected' to the cultures of the steppic Bronze and Iron Age (Francfort 1992:173).

As it will be seen, this argument can be reinforced by the study of animal and human petroglyphic representations that have come to light in the recent years. Some engravings were so far unpublished; while others have been recently published by Bellezza, Germano and Linrothe.

Engraved Animal and Anthropomorphic Representations from the Bronze Age

Firstly, animal representations and, in particular, engravings representing yaks are to be considered. Yaks are easily identified by the rendering of the horns but what is even more typical on some figures is the rounded-shaped tail. This rounded tail is well-known on petroglyphs representing aurochs in Central Asia, South Siberia and Mongolia. For instance, one can consider panels from Ust'-Tuba (Minusinsk basin, south Siberia) and Tsaagan Salaa (Mongolian Altaï.) (Pl. 2) The rounded-shaped tail is considered in those regions as a stylistic feature of the Bronze Age. Thus, it is possible to date such representations from Ladakh and Western Tibet from this period as well. (Pl. 3)

Also dateable from the Bronze Age are representations in the 'bi-triangular' style. Identified in the Upper Indus valley (Jettmar 1982b: 298, 1982c:19), such animal engravings, are also present in Ladakh and Western Tibet (Pl. 4 and 5). Widespread in the rock art of Central Asia these figures are easily recognisable by their narrow waist. Soviet scholars and particularly Sher when analysing the petroglyphs of Sajmaly-Tash (Kazakhstan), have stressed the affinity of such engravings to representations of animals on painted pottery of the Bronze Age in the Near East (Jettmar 1983:298).

In Ladakh and Western Tibet the 'bi-triangular' style is mostly applied to ibex engravings. It seem banal to say so but the ibex is the most frequently represented animal in the rock art of Ladakh and Western Tibet as it is the case in central Asian petroglyphs. This may be easily explained by the fact that the ibex is the most common animal in these mountainous areas, but that would be leaving aside the importance of the ibex in the imaginary of local people. In fact, as Dollfus' study (1988) has shown, in present day Ladakh and Zanskar, the ibex is a symbol of good omen and fertility. For instance, ibex figurines are offered for births and weddings. The fact that this role of the ibex is not found in other parts of the Tibetan plateau whereas it is present westward not only among the oral traditions and rituals of the Kailash of the Hindukush but also among other mountainous peoples in the Pamirs, the Iranian plateau and Caucasus (Dollfus 1988:135-136), clearly indicates that the Western fringes of the Tibetan plateau have been in contact with Central Asia. How and when these contacts came into existence is still an open question. As Tucci wrote contacts between Western Tibet and Iranian cultures are doubtlessly very ancient, and artistic motifs could well have been handed on from Iran to Tibet through migrations and exchanges (Tucci 1973:16). Nevertheless, discussing the nature of these migrations and exchanges is beyond the scope of this paper.

Turning now to human representations, one notice that they are, more often than not depicted in action: fighting, hunting or dancing for instance.

Among the petroglyphs of Ladakh and Western Tibet scenes of fighting and, in particular, archers fighting a duel are frequent. The depiction of these duels is highly distinctive due to the way in which the path of the arrows has been engraved (Pl. 6). These fighting scenes, bearing this particular 'arrow's path', are found all over Central Asia in rock art. Among many others, one can take for example a panel from Tsaagan Salaa (Mongolia) that clearly shows this type of duel (Pl. 7). There, as at other sites in Central Asia, this particular duel scene is dated from the Bronze Age. Such a dating might, in turn, be assumed for similar petroglyphs from Ladakh.

On the engraving from Mongolia the particular headdress of the left archer also has to be looked at. This type of headdress has been identified by some authors as 'horned masks'. Whereas in the Mongolian panel the figure wearing this headdress is a fighter or warrior, in the petroglyphs of the Indus Valley, for instance, some figures wearing it are clearly hunters (Hauptmann 1997: 49 n°3). At the present day, such headdresses are worn by hunters in the Upper Indus Valley and Mongolia (Pl. 8).

Other figures wearing these particular headdresses are represented dancing in the engravings. These headdresses have been identified as: radiating or feathered, according to the Indo-Aryan or shamanistic systems of interpretation (Francfort 1998; Francfort/ Hamayon 2001). In Central Asia, such anthropomorphic figures are known since the Chalcolithic (3rd millennium BC) with the culture of Afanasevo and Okunevo. From this period, the grave slabs of Karakol in the Altai are certainly the most famous examples of anthropomorphic figures wearing radiating or feathered headdresses (Francfort 1991:129). One should draw particular attention to one of the figures painted on a Karakol slab, wearing a twofold radiating or feathered headdress.

whose 'hands' are actually represented by three 'feathers' (Francfort 1994: 46, fig.15) (Pl. 9) Such 'hands' are also found on two engraved dancing figures from Western Tibet, who are also represented with a radiating or feathered headdress (Pl. 10). One finds radiating or feathered masks also in Zanskar (Ladakh) (Pl. 11). In Central Asia, in rock art, during the Bronze Age (that is, Andronovo cultures 2000-1500 BC) such headdresses are becoming more common, as it can be seen from the engraved figures of Samjali-Tash (Martynov et al 1992:30). Consequently, a date between the 3rd and the mid-2nd millennium BC may be proposed for figures wearing radiating or feathered headdresses in the petroglyphs of the Western Himalayas.

So far, Western Himalayan petroglyphs are concerned, that can be dated from the Bronze Age (end of the 3rd millennium/ 2nd millennium BC), based on semantic and stylistic comparisons with rock art from other parts of Eurasia, have been looked at. The engraved representations detailed above (yaks' representations with rounded-shaped tail, ibex in the 'bi-triangular' style, archers fighting a duel and anthropomorphic figures wearing a radiating or feathered headdress) supplemented to the type of representations analysed previously by Francfort (hunter with a rounded-shaped end mace at the waist, 'mascoids' and specific horse engravings) (respectively Francfort *et al* 1992: 149, 150, 151) enable one to assert that during the Bronze Age the Western Himalayas shared some stylistic traits and themes, at least in rock art, with Central Asia.

As for the transition period, late 2nd millennium/early 1st millennium (that is called Karasuk in the steppes), it is best characterized by the representation of the deer with its head reversed over its back. Parallels to such type of engravings from Ladakh have been established with Chinese jade plaques dated from the Western Zhou period (end of the 11th century/ 10th century BC) (Lu Liancheng/Hu Zhisheng 1988). As it has been previously studied in details (Francfort and al 1992: 151) one should now, applying the same comparative method, consider petroglyphs from the Iron Age.

Animal Representations from the Iron Age

Quite a number of engravings with an undeniable steppic look have come to light recently in the Western Himalayas, and mainly in Rutog district. However, only the most significant petroglyphs will be dealt with and particular attention will be given to the development of the 'S motif'.

The most striking representations are those of deer with folded legs (Pl. 12 and 13). Such representations are well-known in the animal style of the steppes in rock art but also on other medium, especially in bronze or gold plaques (For such plaques: Gryaznov 1969: ill. 56, 57 and 58; Bunker 2002: catalogue 135, 136, 142, 143 and 145). As Tchlenova's study shows, the image of the stag with folded legs appeared all over Central Asia during the 1st millennium, but it is not homogeneous and it varies locally (Tchlenova 1963). Exact parallels to the engraved stags of Rutog are not found in other regions. Their distinctivness is the frontal representation of the antlers. It is generally agreed that the frontal depiction of the antlers is characteristic of the oldest deer rock carvings of central Asia and that during the Iron Age the antlers are shown in profile (Francfort *et al* 1992: 183 note 52). Consequently, one wonders if the representation of the antlers as seen from the front combined with folded legs in an image should be considered as a trait of archaism or else as an iconography specific to Western Tibet. Until further finds, it is impossible to decide.

Another well-known stylistic feature of the so-called steppe art is the emphasis of the shoulder blade and the hip on animal representations. Both, or one only, are ornamented with a spiral. Animal representations with spiral ornaments are known since the beginning of the

1st millennium BC and are best characterized by the Arzhan stele (Francfort et al 1990: 15 and fig.15). At the so-called 'mature period' (Saragsh-Pazyryk) of the animal style (6th-4th centuries B.C.) this ornamentation becomes more common (Sher and Francfort 1995: VI). It is worth noting that petroglyphs of animals with such spirals enhancing the shoulder blade or the hip are rare in Western Himalayan rock art. The engraved representation of a gazelle from Lurulangka, on tiptoe and its head turn backwards, is the best example of this early phase of development of the spiral ornament (Pl. 14).

On the other hand, representations of animals whose body is ornamented by the late development of the spiral ornament, the so-called 'S ornament', are numerous in Western Tibetan rock art. The 'S ornament' is also very well-known in the Altaï and the Tuva. It is agreed that the 'S ornament' on animal's representations comes from the joining up of the shoulder blade and hip spirals, but it is not easy to date with accuracy. In fact, the 'S ornament' is not a dating element itself: it is its combination with other stylistic features that enables one to suggest a date for the representations. One can take for instance the engraving of a deer, with antlers spread apart and standing on tips of the hoofs at Renmudong (Pl. 15).

The animal represented standing on tips of the hoofs, and in particular the deer, is a well-known pose in the animal style of the steppes: it seems to date from a period between the 8th and 5th century BC (Francfort et al 1992: 152). Consequently, it is appropriate to date this type of engravings in Western Tibet from the second quarter of the 1st millennium. It seems then that the 'S ornament' can be dated from the same period. On the engraving from Renmudong, the 'S ornament' has retained its significance and origin, as it still emphasize the shoulder blade and the hip. However, there are many animal representations in Western Himalayan rock art on which the 'S ornament' is applied at random. The 'S ornament' is not only applied to any animal representation (yak, wild boar, dog or wolf, etc.) but also on any part of their body (Pl.16 and 17). A date of the second half of the 1st millennium BC is plausible for this type of representation, but it could also be considerably later.

At the same time, the 'S ornament' underwent another specific change: it became an independent motif. There are isolated 'S' engraved at Char, in Zanskar, for example. (Pl. 18) The so-called 'independent S motif' is known in Central Asia, not only in rock art, but also on other medium. One can take for example a wooden bushel from Djoumboulak-Koum (Xinjiang), which is a fortified settlement dated from the mid-1st millennium BC), engraved with such an 'S motif' (Francfort 2001: fig.16). It is likely that the engraved S of Western Himalayan rock art dates from the same period. It is noteworthy that, even the media are different; Xinjiang and the Western Himalayas shared at some point the same artistic motifs.

Once again, during the Iron Age, a comparative semantic and stylistic study with engraved representations, but also on other mediums, from other parts of Central Asia enables one to connect the Western Himalayas to the steppic world. Only a few particular 'animal style' representations (engravings of deers with folded legs, emphasis of the shoulder and the hip by a spiral, body ornamented by a 'S' and independent 'S motif') have been discussed above. (For a discussion of other petroglyphs dateable from the Iron Age from Ladakh and Western Tibet see Francfort et al 1990: 15-20). During the Iron Age, a common artistic entity spread from the steppes to the Western Himalayas in rock art and it is probable that it did so also in other material. Stray finds, like the metal piece in the shape of a bird of prey with its head reversed over its back published by Koenig, could help clarify the question (Koenig 1984). The piece, acquired in Leh, has been rightfully compared to objects excavated in Central Asia and dated from a period between the 8th and 4th century

BC (Koenig 1984: 320; Francfort 1992: 186 note 137).

Finally, though the Western Himalayan petroglyphs have an undeniable 'steppic look', it is very difficult to find exact parallels. Whether this may be explained by the fact that the Western Himalayas is an additional 'province' of the animal style with its own separate line of development or by cultural diffusion through successive transmigration or immigration (Jettmar 1991:3), the present state of research does not allow to decide.

Rock art is very often overlooked by excavation archaeologists but in a region where such archaeology is not yet carried out, the capacity of petroglyphs to bring forward information about the past should not be underestimated.

It should be noted that only one excavation has taken place in the Northern Areas of Pakistan in 1938 (at the site of Naupura where the famous 'Gilgit manuscripts' have been uncovered) as well as in Ladakh (A.H. Francke investigated a large flagstone grave in Leh in 1903 and 1909) (Francke 1994: 68-74, vol. I) while there has not been even one in Western Tibet; although one should mention here the recent archaeological surveys conducted in Upper Tibet by Bellezza (Bellezza 1999, 2001, 2002, 2005).

Although the absence of excavation archaeology is deplorable it should not be considered as a drawback. As it has been demonstrated in other regions, petroglyphs have their own archaeological legitimacy. One can take for example Jacobson's study of the Bronze Age of South Siberia (Jacobson 2002). Through a detailed analysis of specific engraved panels, she proved that the vision of life seen through rock art 'is much richer than can be found in any mortuary context (Jacobson 2002: 44). In other words, petroglyphs do have the ability to reveal information that cannot be retrieved from any other type of archaeology.

The comparative approach undertaken in this paper has helped to reinforce the argument that the Western Himalayas are to be connected to the cultures of the Central Asian steppes during Protohistory. The similarity of the images and style indicates that a common artistic community spread from the steppes to the Western Himalayas, at least in rock art. Through the petroglyphs one sees the persistence of semantic and stylistic peculiarities which characterize the art of the steppic cultures. It is interesting to notice thematic similarities between the rock art of Central Asia and that of the Western Himalayas, but what is even more significant are the missing themes. Certainly, during the Bronze Age the quasi-absence of chariots' representations is the most striking. Whereas such engravings are rare in the Upper Indus Valley (in fact only two engravings are known: one at Thor-North and one at Dadam Das) (Jettmar and Thewalt 1985: 13; *MANP* 5: 46), they are (at the present state of research) inexistent in Ladakh and Western Tibet. It is a task for the future to explain why the subject matter of the petroglyphs informs one of cultural choices? Was it consciously done or not. From a stylistic point of view too, in spite of shared artistic formulae like the rendering of tails by a rounded-shape or the enhancing of hips by a spiral, there are some omissions (once again, for the time being), for example animal representations with angular humps or with twisted hindquarters. They will also have to be accounted for.

Briefly, mention should be made of a large number of petroglyphs, relevant for the study of the historic period and in particular of Buddhism, that have been consciously left aside. Jettmar stated some 17 years ago that 'certainly a typological study of the Buddhist monuments is overdue' (Jettmar 1989: 180). Such a typological and chronological study of the stupa engravings of the Upper Indus valley has been recently carried out and has brought fruitful results concerning the diffusion of Buddhism in the region (Bruneau 2003). Without a doubt a similar study will be successful in better understanding the history of Ladakh and Western Tibet. Through petroglyphs one notices that sometime at the turn of the first millennium AD the Western Himalayan regions shifted from the central Asian cultural sphere of influence to the Indian one and later on (late 7th/ mid-9th century AD) to the Tibetan one, as the study of some Tibetan rock inscriptions from Ladakh seem to indicate (Denwood 1977: 163, Denwood and Howard 1990: 85, Orofino 1990: 177). Fully understanding why and how these changes occurred is a task for the future.

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Interaction between Western Indian Subcontinent and Iran in the 4th -2nd Millennia BC

Ozra Rounaghi[*] and V.S. Shinde[**]

When Professor Sankalia encountered in the excavations at Navdatoli in Central India certain pottery forms and decorations having similarity with pottery forms and decorations found at the sites of Tepe Hissar in the Northeast and Tepe Sialk in the central Iran, he had formulated a hypothesis suggesting contact between these two regions in the Chalcolithic times. Considering spatial and chronological gap, there were very few takers for his hypothesis and his efforts did not receive enough attention for last forty years. However, recent discovery of clay seal impressions at Gilund, suggesting cultural contacts with BMAC of Central Asia and the Persian Gulf region towards the end of third millennium BC, further corroborates the evidence about the contact between these regions. These contacts may not be direct, but could be through the Chalcolithic community of northwest and western Indian subcontinent, including the Harappan .

Cultures and Area of Research

The proposed area of investigation includes the central and Northeast of Iran and the Northwest and western Indian subcontinent. The Chalcolithic cultures flourished between 4th -2nd millennium BC in both regions have been considered for the research with special emphasis on the sites of Tepe Hissar and Tepe Sialk in Iran and Navdatoli and Gilund in India (Fig. 1).

The Chalcolithic period marks a major transitory step in the evaluation of human culture. Of the numerous Chalcolithic cultural traditions flourished in semi-arid climatic conditions, the Malwa culture that mainly flourished in central India will be considered for study as the site of Navdatoli near Maheshwar, (Fig.2) the most important Malwa tradition site in Central India, has been excavated on large-scale and the Malwa ware found there has certain shapes and designs similar to those found in Iran. On the basis of this evidence Sankalia had propounded a "West Asian Cultural Contact" hypothesis.

Considerably good number of sites have been excavated in Central India including Nagda, Eran, Ahar, Balathal, Gilund, etc.

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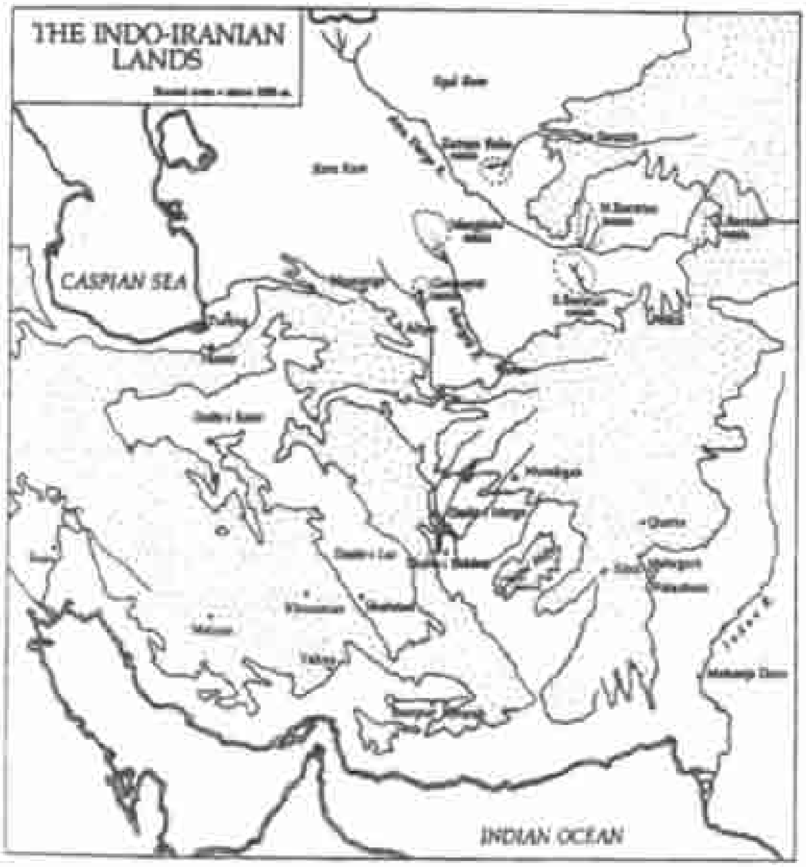


Fig. 1: Map of Iran showing the area mentioned in the text.

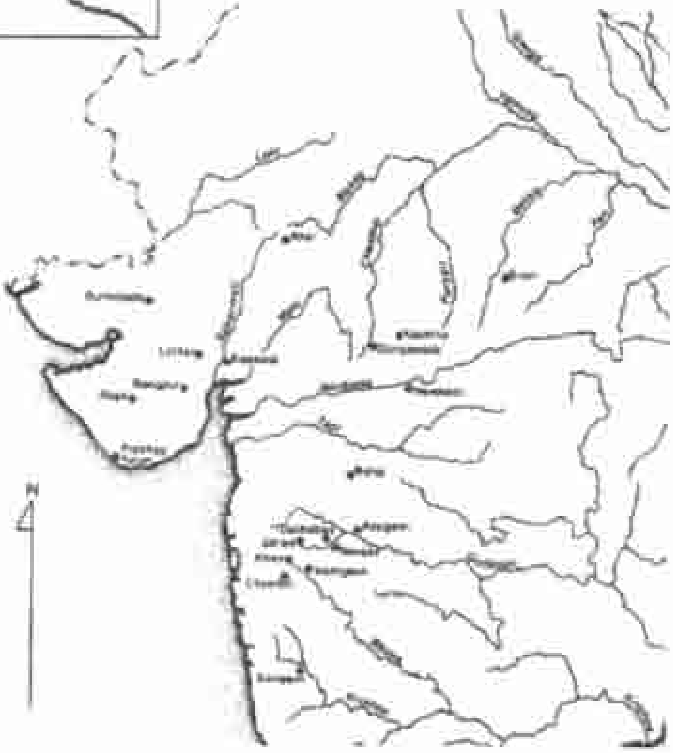
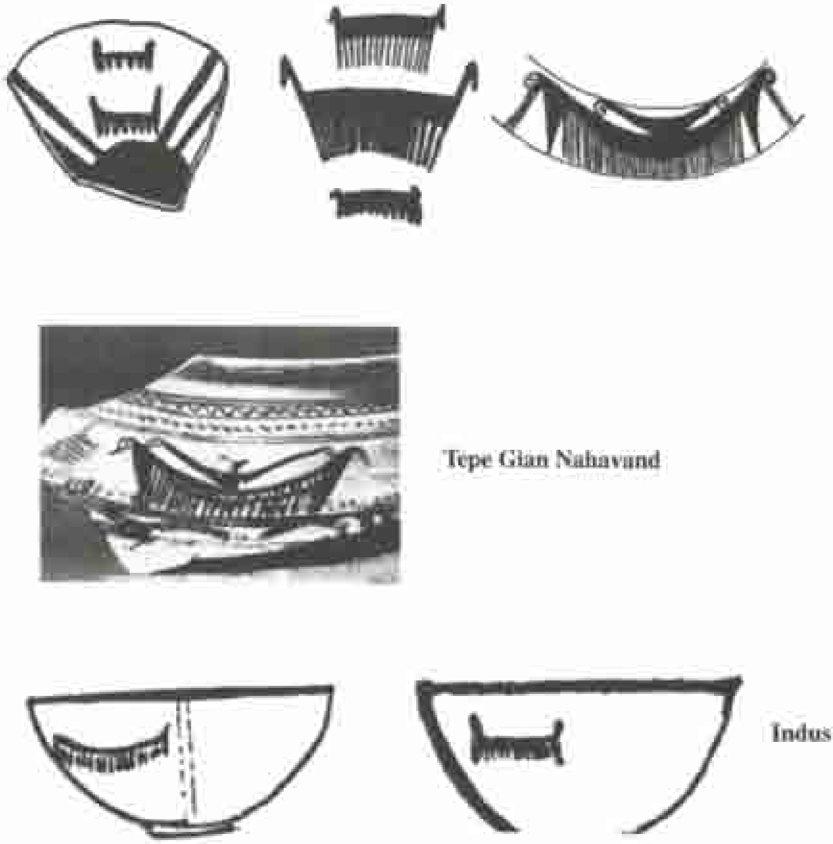


Fig. 2: Map showing western India with some of the important sites mentioned in the text.

The most recent work carried out at the site of Gilund has produced some evidence indicating contact with Iran. The contact may have come through the Chalcolithic cultures of northwest and western India and therefore that region and the cultures flourished there will form an important part of this research. Data from these excavations can also be taken into consideration for the study purposes. It can be compared with two examples from Amri in Baluchistan (Fig. 3 and Pl. 1) With other designs of comb animal from Susa I that, this similarity is perfectly clear. Double-bodied comb animal from Tepe Gian Nahavand region can be compared with another examples from Indus Valley in this plate.

The Neolithic tradition in Iran is succeeded by the proto-literate traditions, termed Chalcolithic. The Iranian Chalcolithic can be subdivided into an early (5500-4800 B.C), middle (4800-3900 B.C), and late phase (3900-3500 B.C).

The early archaeological history of the Iranian people is still imperfectly known. Two sites are important from the point of view of the proposed study-the site of Tepe Hissar near Damghan in the northern region and Tepe Sialk in the centre of Iran. Both these sites excavated on large scale have yielded evidence about the contact with central and North West of India during the Chalcolithic period (Pl. 2). Some of such motifs and shapes from Iran that show cultural contacts with the Indian subcontinent have been reported from the Elam region of Mesopotamian civilization where



Amri, Tepe Gian

Tepe Gian Nahavand

Indus Valley

Fig. 3: Comb Animals

an important site of Susa is located (Pl. 3).

Interaction between these regions

To develop the knowledge of interaction between settlement and region it is necessary to understand the process of growth and development in early Chalcolithic cultures. It will be necessary to utilize every available evidence-archaeological and historical from every possible source for expression of this interaction.

Interaction can be defined in two major categories:

1. The first resulting because of trade:

a. A long distance trade, involved in precious stones, steatite, shell, and mineral ores.

b. Short distance or local trade, with local craft items-ceramics etc.

2. The second source of interaction may be religion (Shaffer 1972).

Trade and religion are but two interaction spheres of the several. This must have existed at any given time (Renfrew 1972). It is also well documented archaeologically, with trade network reaching as far east as the Indus Valley. Similarities of Iranian Archaeological sites with that of Indian sites indicate interaction between these regions through the Harappan culture.

It would now be important to investigate a possible connection between the beginning of this process of regionalization of the Indus civilization, as seen from Nausharo, and the emergence of the Bactrian civilization in the western part of a province where, in its eastern part, settlement of Indus civilization were probably found at as early as the mid-third millennium (Jarrige 1993).

During the early Harappan period there appears to have been increasing contact and interaction between the several separate regional cultures which was the result of growing trade and communication. Sir Mortimer Wheeler says, "the pottery of the Harappa civilization is generically similar to that of some of the village communities in or below the Baluchistan as to that of Sumer" (Shaffer 1972). In addition to Babylonia and to the painted pottery cultures which had spread into western India from Baluchistan may have played an important and perhaps, decisive role."

In India the east Caspian immigrants may have met traders from Iran and Afghanistan into Punjab. Through the routes of Iran across the Elamite countries that began not far to the west of its frontiers, Harappan culture has been continuously linked to the Near East.

A fine analysis by Robert H. Dyson Jr. on the chronology of Iranian archaeology, based on the synchronisms provided by Mesopotamian ceramics, has shown that on two occasions this ceramics had reached the limits of the Indus domain, in Baluchistan-Afghanistan, the first at the Ubaid horizon, c. 4800-3900 BC, the second during what he calls the "ancient dynastic horizon".

When the Mesopotamian ceramic influence covers Iran and is seen in Baluchistan in that of Kulli, towards 2800/2600 BC, that is at the moment when the ancient Harappan culture begins to form. This seems to correspond to the expansion of Elam up to Baluchistan.

Several types of Kulli pottery are in fact common to the whole of Iran, both near Bampur river valley and Makran coast, in south-east Iran and far at Bakun A, south-west Iran, such that it is difficult to make a clear geographical differentiation, from the east to the west of Makran, between the Kulli type and Iranian pottery.

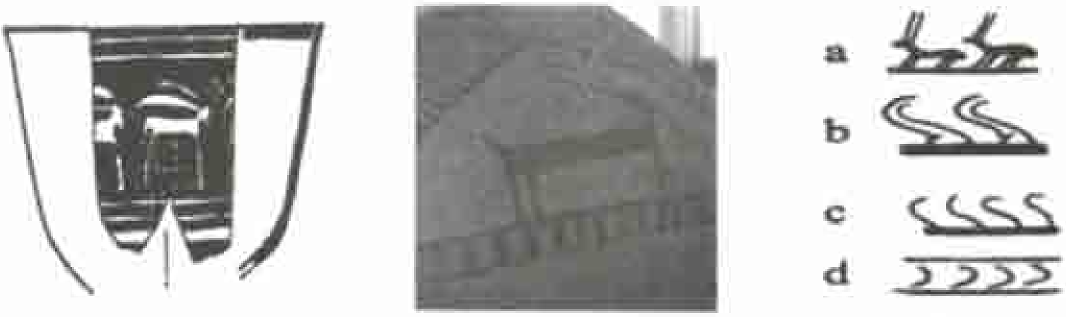
As Kulli was slightly later in date than Amri and

Nal, its area of interaction was widespread from south-east Baluchistan to the area of Bampur complex and Oman, Persian Gulf, Uman - an-Nar etc.

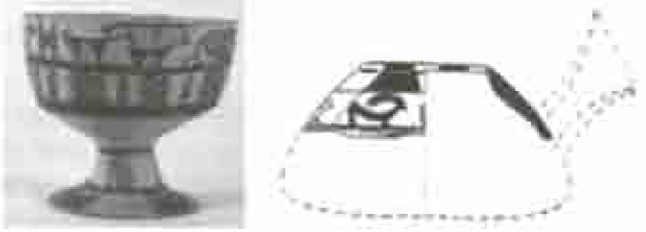
The figurines at Kulli prolong those of Mehrgarh but are also inspired by those of Elam (Harris) (Pl. 4 and 5). Harappan levels show the continuation of some components of the Dashte/Bampur material of period III B. *viz.* the painted Grey ware and the development of so-called Kulli Pottery. The associated local finds will enable us to reconsider the settlement patterns of the region during Harappan times. A unique example of this contact is the typical Harappan jar decorated with a typical Iranian –Baluchy frieze of caprid animals. Pottery from Kile Ghul Mohammad- Togau-A that, many specialists had related to those from south of Iran Sialk and Bakun -shiraz (Fig. 4). Some motifs and vessel shapes found in Peninsula are sometimes also linked to the Kulli, which is seen as indications for long- distance contacts. The Fifth phase of cultural development at Mehrgarh commences around 3500 BC when the people were more social and the clay vessels had developed to a great extends.

The people of the era used to travel between other villages and towns of that time, sharing cultural heritage with the people of the other parts of the province including the Quetta valley (Begum Sofia Fazal 1993).The Bactria – Margiana Archaeological Complex had developed in the alluvial basins of northwestern Afghanistan, southern Uzbekistan and the Murghab delta at a time when the urban systems of south Turkmenia and Indus Valley whre going through an important process of transformation (Fig. 5).

When the first traces of a chalcolithic culture were

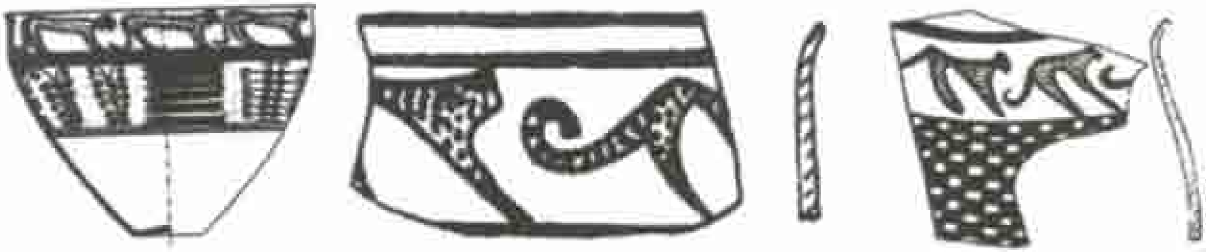


Tele Gap, Iran **Luristan, Iran** **Togau Ware**

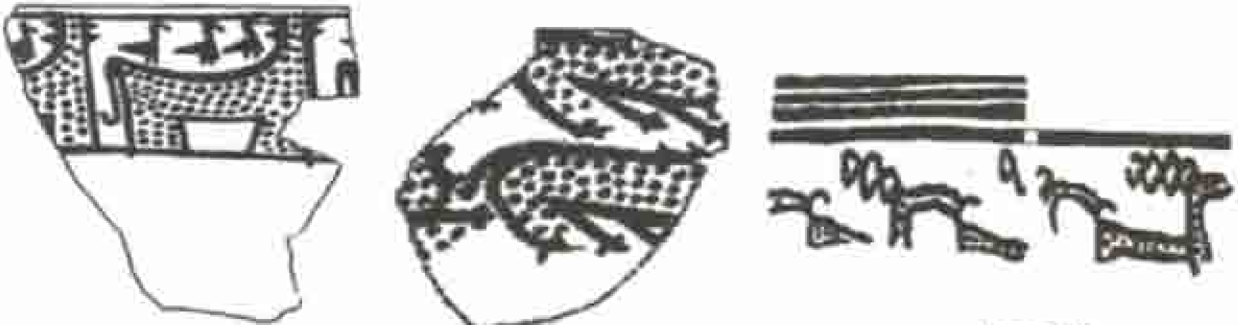


Tepe Hissar **Tele Bakun**

Fig. 4: Animals Motifs our Iranian Pottery



Sialk animal with Dot



Navadatoli

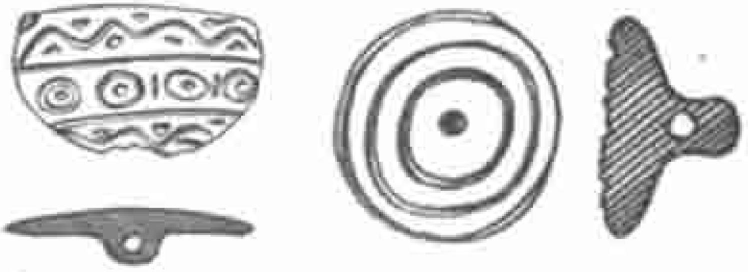
Namazga III kara-Depe Animal with Dot

Fig. 5: Spotted animals on Iranian and Indian pottery

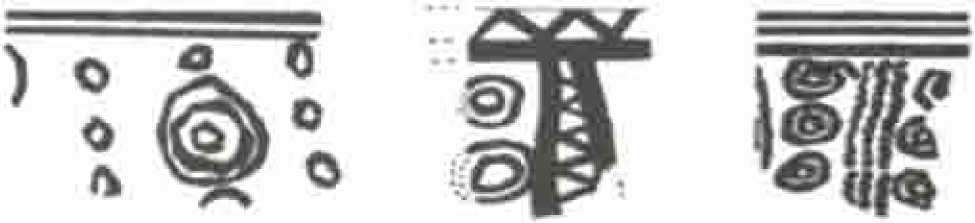
found at Maheshwar and Navdatoli on the Narmada, some 97 kilometers south of Indore and also at some places between Ujjain and Indore, all these cultural manifestation were grouped under one cultural-geographical name of Malwa culture (Sankalia 1977). Initially the evidences of Harappa influences had been observed at Nagda that is located in the upper part of northern Malwa (Dhawalikar 1971). This influence can also be observed in its contemporary cultures as in western and central including Gujarat, Rajastan and Narmada valley (Pl. 6 and 7 and Fig. 6-8)

Ahar culture in Mewar regions, the Kayatha culture and Malwa culture at Navdatoli and Maheshwar and Eran with Black and Red & Black on Red Wares can be dated between the periods of 4th millennium BC and 1st millennium. One can also find its roots with regional interaction and inter- regional interaction through Harappan cultures. The corded pottery seems to carry this influence just as the black and red ware points to the western influence in India.

The position of Eran is very important in Indian archaeology. Eran may be terminal station in the movement of cultures. It may be proved on the basis of chronology and also painted designs similar to Ahar. There are certain Harappan traditions (Rao 1969)

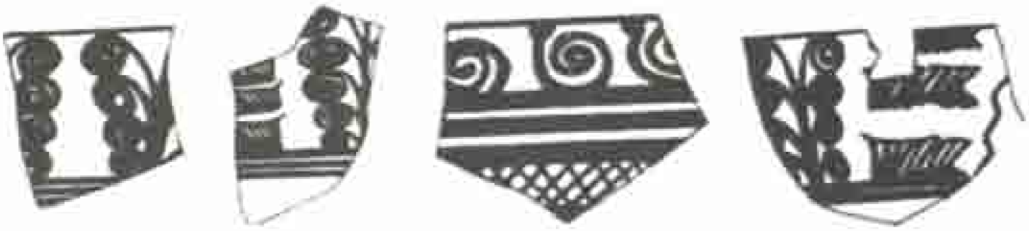


Tepe Hissar, Iran, Circle Motifs on Seals

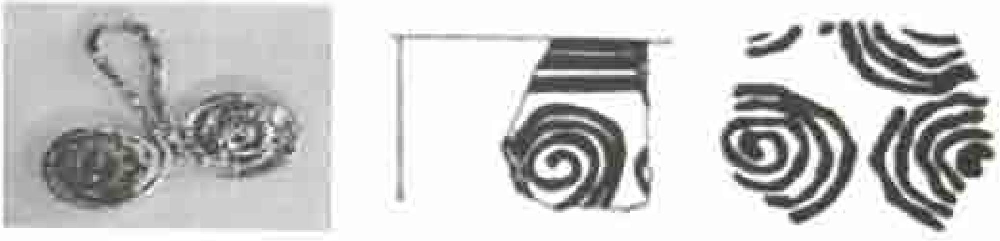


Navdatoli Malwa Ware, Circle Motifs

Fig. 6: Similar motifs on Indian and Iranian pottery



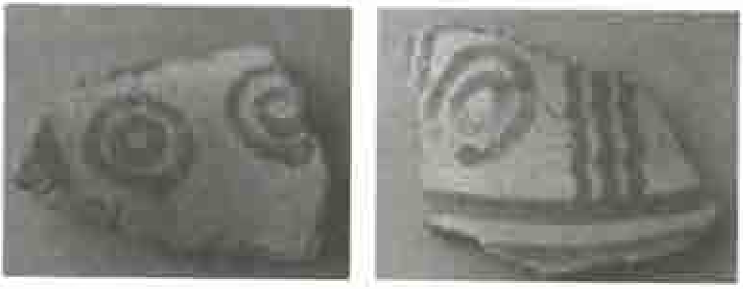
Tepe Sialk-Iran, Spiral Motifs



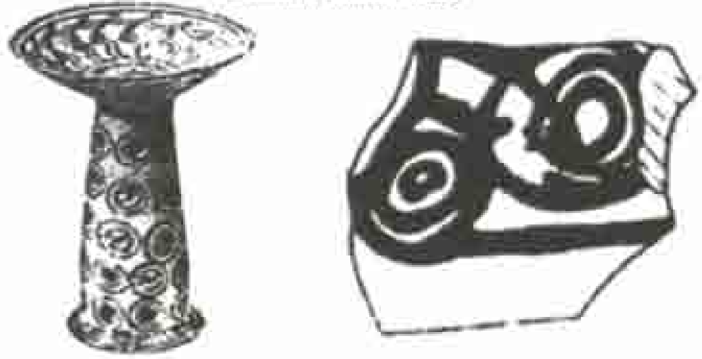
Tepe Hissar

Navadatoli Spiral Motif

Fig. 7: Similar motif on Indian and Iranian Pottery



Navdatoli, Malwa Ware



Tele Bakun- Tepe Sialk

Fig. 8: Similar ware from Navdatoli and Tepe Sialk

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Further Excavations at Agiabir (2005-06)

VIBHA TRIPATHI AND PRABHAKAR UPADHYAY*

Among the river-bank townships of ancient India, Agiabir (Latitude 25°13' 52" N; longitude 82° 38' 41" E) holds an important position. Its location between two important *Mahajanapadas* of Kashi and Vatsa must have been strategically significant – politically as well as economically. The site, located on the left bank of river Ganga grew from a small hamlet of Chalcolithic settlers to a well developed township by Sunga - Kushana period. The present mound is located near Katka railway station on the Varanasi - Allahabad section of northern railway in district Mirzapur, Uttar Pradesh. The ancient settlement extends in an area of more than a kilometre along the river in the form of a series of four mounds of different size and height (Fig. 1). In fact, Mound-1, 2 and 3 fall in the administrative boundary of Mirzapur district whereas the western part of the settlement *i.e.* Mound-4 fall in revenue village Dwarkapur, district Sant Ravidas Nagar, Uttar Pradesh. A Nala joining river Ganga from north separates Mound-1 and Mound-4 and it also forms the boundary of these districts. Mound-1 and 2 were found suitable for excavations as so far these are less disturbed by modern human activities. The Department of Ancient Indian History, Culture and Archaeology, Banaras Hindu University excavated the site in 1999-2001 (Singh and Singh 2004). The work was resumed again in March-May, 2006 under the direction of the first author. The work was collaborated by a team of palaeobotanists led by Prof. M.D. Kajale of Department of Archaeology, Deccan College Post-Graduate and Research Institute, Pune.

In this session's (2005-06) excavations six trenches measuring 5m x 5m square and 3m x 3m were opened on the main mound (mound-2) and Mound-1 respectively. The trench (A-1) at mound-1 reached the natural soil at a depth of 2.30 m. The excavation was carried out at the main mound (mound-2) upto a maximum depth of 7 m. without reaching the natural soil (Fig. 2). Several burnt brick structures ascribable to Kushana and Gupta periods were exposed. Mention may be made of certain interesting discoveries such as a kiln of NBPW period (Pl. 4) and a very deep (30 feet) underground brick structure (Pl. 7) of Sunga-Kushana

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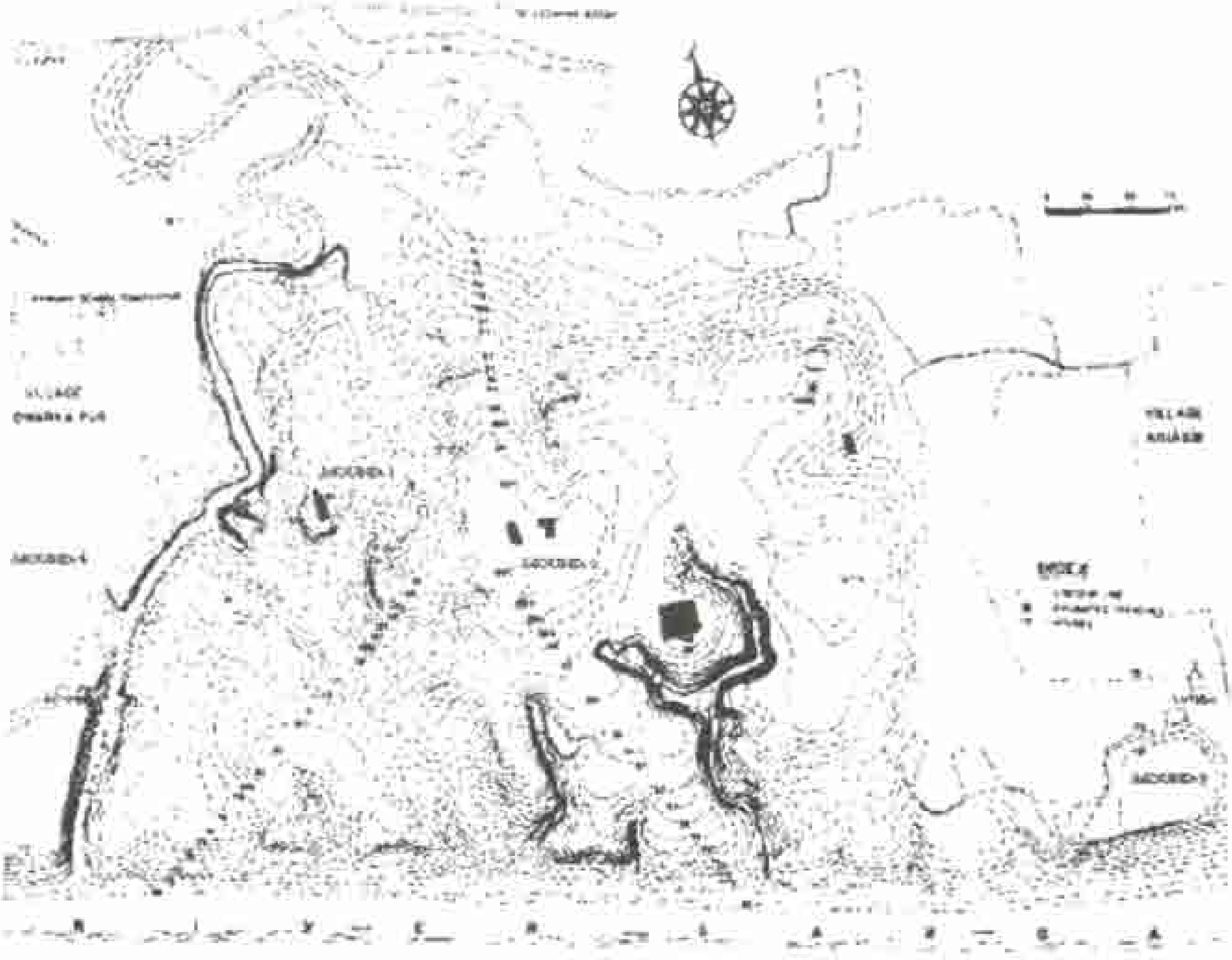

Fig. 1: Contour plan of the site

period. A brief summary of the results of the excavations of session 2005-06 are being given below.

The excavation revealed five cultural periods:

Period I	:	Chalcolithic
Period II	:	Pre-NBPW (with iron)
Period III	:	NBPW Period
Period IV	:	Sunga-Kushana Period
Period V	:	Gupta Period

Period-I

The earliest settlers of the site known so far occupied a small area away from the bank of river Ganga. Instead, they chose to settle on a safer and higher location close to the *nala* joining the Ganga at Mound-1. We excavated a very small area (Trench A'1) in this session yielding cultural remains of Period-I. Previous excavations at Mound-2 had brought to light cultural remains of Period-II at a depth of more than 10 m towards southern side of the mound. Below this deposit was found natural soil. To ascertain the earliest cultural period at Mound-

2 we opened Trench AM-5 almost in centre of Mound-2. But we could not reach the natural soil at the mound despite digging up to a depth of 7 meters.

The material culture of Period-I are represented by a 70 cm thick cultural deposit at its maximum at the Mound-1. The inhabitants of this period lived in mud houses. Good quantity of mud clods with reed marks were recovered from this period. No metal object was found in this session's work. Metal objects were not very common in this period in the entire area of middle Gangetic plains. In fact, baring a solitary fish-hook of copper, so far no metal object could be recovered from this period. Besides hopscotches that occur in large number, other small findings comprise only a bone arrowhead. The main ceramic industries of this period are black-and-red ware, black slipped ware and red ware. The main pottery types in black-and-red ware are pedestalled bowls, plain bowls, basins, *lota* shaped vessels and vases. In the black slipped ware bowls, beakers and *lota* shaped vessels are the principal types. In red ware bowls, perforated legged bowls and vases are the main types.

A charcoal sample recovered from a pit cut in natural soil and sealed by layer 4 from trench A-1 yielded a radio carbon date of 2908 years BP (calibrated, BS-2640, S-3458). This date may be accepted as terminal point of Period-I.

Period-II

Period-II belongs to pre-NBPW deposit which was marked by the introduction of iron. Deposits of this period were found in all the trenches at Mound-1 in previous excavations (Singh and Singh 2004). Besides, the layer belonging to this period was also noticed towards southern part of Mound-2 resting on natural soil (Singh and Singh 2004). This area is closer to Ganga than that of Mound-1. Layer (17) of the trench AM-5 located in the middle of the Mound-2 belongs to this period. It is now definite that Mound-2 was continuously inhabited at least from pre-NBPW period to Gupta / post-Gupta period.

The inhabitants of this period continued to live in wattle-and-daub houses as in the preceding period but they occupied larger area of the site than the preceding period. Thus, a cultural expansion coupled with a population growth may be inferred. The antiquities of this period comprise beads of terracotta and semiprecious stones like agate, bone points and a large number of terracotta discs. No iron or copper object was recovered in this session of excavation. The main ceramic industries of this period are black slipped ware and red ware. A noteworthy feature is a near absence of Black-and-red ware in this period. However, the excavated area belonging to this period is very small. The principal pottery types in black slipped ware are bowls and dishes. In red ware the bowls, dishes and vases are the main types.

Period-III

Period III belongs to NBPW period. Considering the total area occupied by the inhabitants of this period, its extension was the largest at this site. Deposits of this period were found at all the four mounds of the site. It was represented by more than 3 m thick deposit on the main mound. Habitational deposits of layers 9 to 16 in trench AM-5 belong to this period. Different shades of NBPW (golden, silvery, pink, steel blue and chocolate) were recovered in a good quantity (Pl. 1). Few sherds of painted NBPW are also recovered from this period. The other associated wares of this period are black slipped ware, grey ware and red ware. Straight sided bowls, flanged bowls, dishes etc. are the main types of NBPW, black slipped ware, red ware and grey ware. Remains of rammed floor, ovens etc. were recorded from this period. Fragments of baked bricks noted in layer 10 (belonging to later phase of NBPW culture) in trench AM-5 suggest beginning of use of such bricks during the later phase of the NBPW culture. The antiquities of this period comprise beads of variety of materials including semiprecious stones like agate, carnelian, jasper, chert, faience and glass (Pl. 2), bone points and arrowheads. Terracotta objects include skin rubbers, beads, discs, gamesman and balls. Copper objects include antimony rod, bead, bangle and ring. Iron is represented in the form of nail, hook, chisel, sickle, spearhead and a number of indeterminate objects. A unique ivory handle was also recovered from this period (Pl. 3). It has incised design all over, having a smooth shining surface. The inner part of the handle has threads grooved in it for a handle to be screwed on.

One of the most important discoveries of this period was a big sized kiln exposed in the trench YE 6 (Pl. 4). The kiln was found in layer (11) and (12) and was resting on the top of layer (13) which represents a rammed floor. It is a thick and neatly finished floor made of finely pounded bricks or *surkhi*. This kiln is rectangular with roundish corners. It is 2.15 m long and 0.95 m wide. The depth of this kiln is one meter. Its mouth is projected towards the eastern direction with a port-hole like opening. An almost complete storage jar and fragments of few other big vessels were recovered *in situ* from this kiln. The stratigraphy shows that the kiln was made by the inhabitants of layer (11) and by cutting the layer (11), (12) and the top of layer (13) which is a rammed floor. A charcoal sample (BS-2641, S-3459) collected from a post-hole of this rammed floor, 70 cm south of the kiln, gives a radio carbon date of 2779 years BP (calibrated). The exact nature of this kiln is yet to be ascertained.

The most interesting finding of the Agiabir excavation (2000-01) was a 'cache' of ten copper and

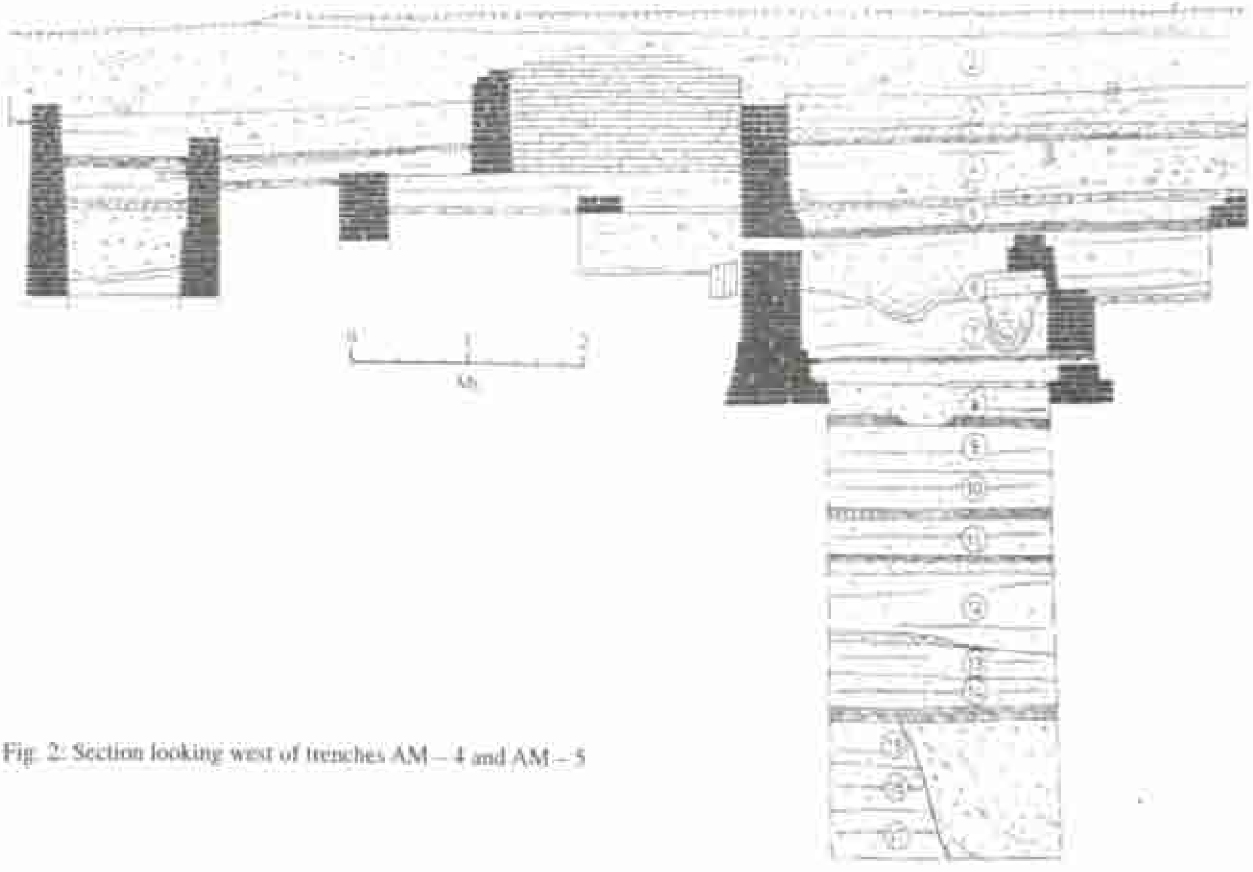

Fig. 2: Section looking west of trenches AM – 4 and AM – 5

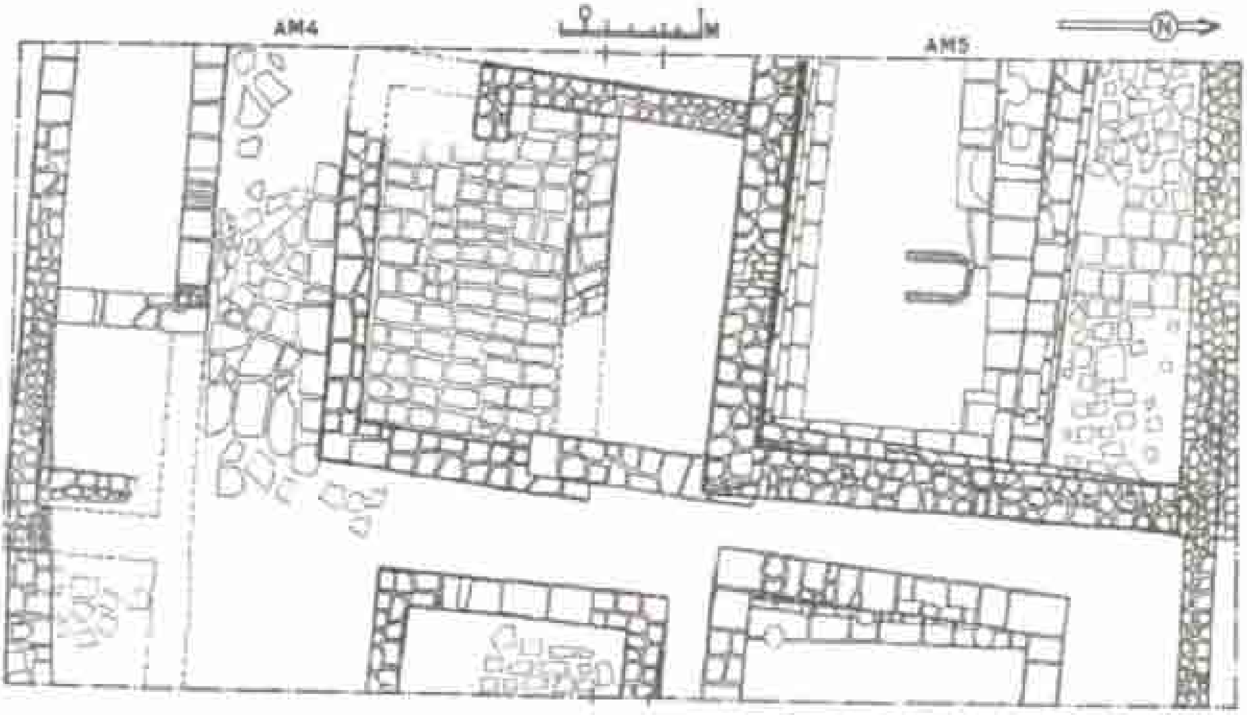

Fig. 3: Plan of the structure of locality 2

three iron objects *in situ* from the mid phase of the NBPW period (Singh and Singh 2004: 51). The copper objects include three big cooking vessels (*handa*) with body diameters of 35 cm, 37.6 cm and 41 cm respectively, two big carinated *handis* with body diameters of 31 cm and 30.8 cm respectively, one knobbed lid with body diameter 33.6 cm, one *lota*-shaped vessel with body diameter 15.5 cm, one bowl with mouth diameter 15.1 cm, one miniature bowl with mouth diameter 11 cm and a tanged mirror of 14 cm diameter. The iron objects include two swords with length of 69.5 cm and 64.5 cm respectively and a big lamp stand of 1.07 cm length. The diameter of the base of this iron lamp stand is 43 cm. This finding of copper and iron objects appears unique considering the other objects recovered from this period at this site. These metal objects were recovered towards the end of the excavation season. To ascertain their precise stratigraphical position and plan of the structure, two trenches (YE-6 and YE-5) were laid at the location from where these metal objects were recovered. It was noticed that these metal objects were kept on a clay platform of 1.65 x 1.65 m size at a depth of 6.70 m in layer 12 (Tripathi *et al.* 2005-06: 16). Next to this platform, a 20-25 cm thick floor rammed with potsherds and *surkhi* was noticed throughout this trench.

Period-IV

Period-IV belongs to the Sunga - Kushana periods. Remains of this period are found only at Mound-2 and 3. It was represented by all the typical potteries of this period *viz.* red ware and red slipped ware with bowls with incurved rim, large storage jars, sprinklers and bottle necked jars, button knobbed and inkpot lids, basins and miniature vessels as the main types.

The excavation was conducted with a view to get an idea of the settlement pattern of this period. To achieve this, trenches were opened in three localities at

Mound-2. The structural activities of this period were dominantly in burnt bricks. The stratigraphical evidence shows that the houses were made in three phases. In the upper phase structures were generally built of reused bricks. In previous excavations a house complex of 11 rooms with a courtyard and a boundary wall was exposed in locality-1. During the current excavation in this locality, a small well aligned with burnt bricks was noticed (Pl. 5). This well was sealed by layer (6) which belongs to mid phase of Period-IV. Noticeably, this well is situated in the premises of the house – complex which indicates that this was an important locality of this period. For some reason the inhabitants of the succeeding period (Period V) closed this well and made a squarish platform (1.35 x 1.40 m) over it. This platform was seemingly constructed for some religious purpose (Singh and Singh 2004: 42).

In locality-2 (trenches AG-3, AG-4 and AH-4), the wall of two rooms and an underground structure were exposed in trenches AG-4, AH-4, and AG-3 (Fig. 3, Pl.6). The walls of the room were thick with a filling of broken bricks with complete ones dressing the facing. The underground structure was interesting, indeed. It was made of complete bricks of Kushana period. The size of the underground structure is 2m x 1m with rectangular holes at regular intervals lest it collapses. The underground structure could be exposed up to the depth of 8.37 m without reaching the lowest levels (Pl. 7). A good number of bowls of red ware with incurved rim (*Parai*) were recovered from this underground structure. Interesting find in a house complex nearby was discovery of large amount of charred rice grain. It was in the form of lumps. The impression was that this amount of charred rice could belong to some religious ritualistic activity. Despite our best efforts, it was not possible to recover any definite shape etc. to substantiate this.

In locality-3 (AM-4 and AM-5), we exposed houses, passages, brick floors and doors (Fig. 4, Pl. 8). A floor of burnt bricks and few walls of a rectangular structure were exposed in these trenches. Due to limited excavations of this area complete plan of these structures could not be fully ascertained.

Small finds of this period comprised terracotta human and animal figurines, beads of semi-precious stones, stone balls, glass beads, bone points and arrow heads, bone disc, iron and copper objects (including one copper mirror). Terracotta objects include beads, discs and balls. In our limited excavations, occurrence of six sealings of baked clay and eighteen copper coins (Pl. 9) are indeed important.

A copper mirror, circular in outline, has a pointed handle. The face of the mirror is smooth and slightly concave (Pl. 10). Diameter of the mirror is 10.6 cm, thickness 0.5 cm and length of handle (tang) is 5 cm. Similar copper mirror but slightly, bigger in size was recovered earlier from this site which belongs to the mid phase of NBPW period (Singh and Singh 2004: 58).

Period-V

Period V belongs to Gupta and post Gupta times. Few walls of preceding period were made use of in this period also. Due to brick robbing of upper levels, the structures of this period were found in most disturbed condition. A drain of reused bricks was noticed which was attached to the underground structure of period IV for the disposal of water (Pl. 6). Traces of brick paved floors and a thick rammed floor made of very small fragment of baked bricks and potsherds were found in the excavation. Comparatively speaking the structural remains of Gupta period at Agiabir are better preserved at several blocks. Further excavations will provide us better insight into structural scheme and house plans of this age.

Three sealings of baked clay are the important discovery of this period. An interesting sealing is one with a *Nandi* figure and an inscription *'Shree Kumar Dagdhalasya'* in Gupta Brahmi script inscribed underneath (Pl.11). Other small finds comprise terracotta human and animal figurines, three beads of semi-precious stones, two stone balls, one bone point, three copper objects and twelve iron objects, four balls, two discs, seven gamesmen and eleven beads of terracotta.

A solitary moulded figure of *Ganesha* with its trunk, right hand and left leg missing, is an interesting find (Pl. 12). The stylized eyes in typical Gupta style, thick necklace made with appliqué technique and a distinct incised design are its noteworthy features. A thick red slip has been applied on the body which has peeled off at places. Star shaped mother goddess and figures of a *Naigmeshi* having a goat's face are other noteworthy findings related to ritualistic activities (Pl. 13).

The ceramic industry of period V is essentially of red ware. Vases and storage jars, knobbed lids, *parai* and miniature vessels are the principal pottery types of this period.

Conclusion

Excavations at Agiabir revealed almost an uninterrupted sequence of early cultures of middle Ganga plains right from Chalcolithic period to Gupta / post-Gupta period. The early settlers preferred to occupy an area close to a *Nala* joining the river Ganga instead of the bank of river Ganga itself. Significantly enough, the location must have not only been a safer one providing protection against the fury of floods of major rivers like Ganga but had all other advantages of the

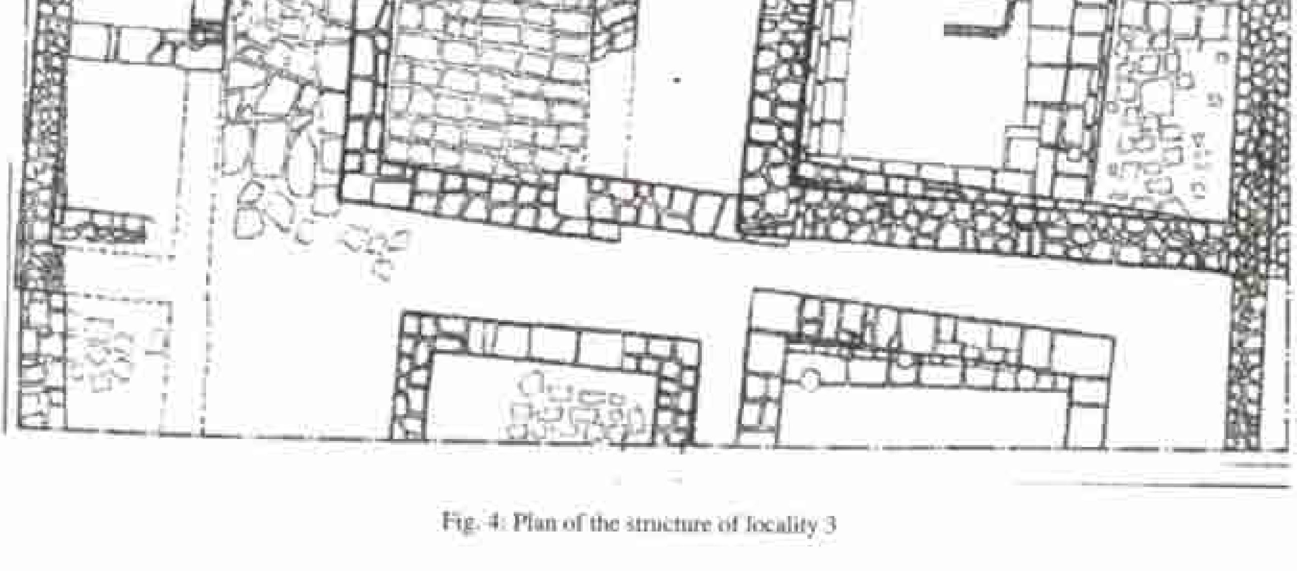

Fig. 4: Plan of the structure of locality 3

communication network provided by the rivers of this system. Across the Ganga on the other side of the bank lies the Vindhyan hills that can provide raw material required for tools and industry like bead manufacturing. A workshop of bead manufacturing was revealed in the course of the previous excavations complete with finished and unfinished beads, waste material, working area of the craft activity etc. The bead manufacturing workshop of this period is an indicator of their superb craft skill. There is a possibility that these beads were a commodity manufactured for exchange to other centres of this period. Copper objects play negligible role in the material prosperity of the culture at the early stage. People lived in wattle-and-daub houses as evidenced by good quantity of mud clods with reed marks recovered from this period.

In the succeeding period (Period-II) iron was introduced but no marked change is perceptible in the material life of the people. However, tradition of bead manufacturing continued. There is continuity in the ceramic industry also but a sharp decrease in number of Black-and-red ware was noticed. Improvement is evident in the pots of black slipped ware particularly in their slip. Inhabitants of this period occupied a larger area than the previous one and their expansion is attested to at Mound-2 too. This fact suggests a growth in population. In NBPW period settlement area extended visibly. Remains of his culture were recovered from the excavations of Mound-1, 2 and 3 and also from section scraping of Mound-4. Cultural remains of this period fully correspond with that of other sites of the region. Due to its prime location on the bank of Ganga there is a strong possibility that the river provided an impetus to long distance trade. The large number of copper and iron objects of big size recovered from this period bear testimony to it. This trade activity must have gained its full momentum in the succeeding Sunga-Kushana period. In this period the site entered the developed urbanization phase. Kiln-fired bricks were extensively used in the building structures, floors, drains and wells. Baked tiles were profusely used for roofing. Large number of copper and iron objects, beads of semiprecious stones and glass, copper coins, seal and sealings and a well developed clay art of this period suggest that it was the most prosperous period of the site. This prosperity is also seen in the early phase of the Gupta period. But degradation is evident in the material remains belonging to later phase of the Gupta period. Structural remains of this period are badly disturbed due to brick robbing by nearby villagers. Bricks of preceding period were generally re-used in the structural activity however, new bricks were also made. After Gupta period the site seems to have been deserted.

The cause of desertion at this site is not known. In middle Gangetic plains a large number of urban sites are found to have been suddenly deserted after Gupta period. However, at Agiabir, a few structural remains such as stone jambs of temples, broken sculptures of deity Ambika, Ganesh, Surya and Ekmukhi Shivalinga datable to 10th – 12th century AD are laying at a present day temple located at Mound-3. This indicates that in the early medieval period, the religious importance of the site continued but its commercial activity received a set back. Its possible causes are difficult to ascertain. This is a general feature of the archaeological scenario of the Ganga plains. There appears to be a reversal of culture towards a rural life with agricultural activity and self sufficiency.

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An Archaeological Exploration in Sundarbans, Bangladesh

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The Sundarbans lies between 21° -30" and 22° -31" north latitude and between 89° and 90° east longitudes, is one of the largest mangrove forests and it is declared as a world heritage site. The forest is demarcated on the west by the river Bhagirathi, on the east by the broad channel of the river Meghna, on the north by the southern limit of the districts of Satkshira, Khulna, Bagerhat, Patuakhali and 24 parganas and on the south by the Bay of Bengal. This vast rivery plain is named as the Sundarbans, which is full of *sundari* trees and dense forest. Scholars are of opinion that the Sundarbans was named because of the plenty of *sundari* trees. Except *Sundari* trees *geoya, keora, ora, pashur, garan, bain* and a number of different kinds of trees and creepers are also found. A number of large rivers and their countless tributaries flow in the Sundarbans. Among the large rivers of the Sundarbans, rivers Haringhata and Baleshwar are on the east, the Pashar and Shivsa on the middle and the Kapotaksha, Arpangasiya, Raymangal and Harinbhanga are on the south and west. All of them flow from north to south and fall in the Bay of Bengal. The place of origin of these rivers is the Ganges or the Padma.

Geologically the land of Bangladesh can be divided into three broad categories of physiogrphic regions. These are the tertiary hills, the pleistocene uplands and the recent plains. The recent plains can be further subdivided into piedmont plain, flood plain, deltaic plain, tidal plain and coastal plain (Islam *et al.*: 9). Geologists are of the opinion that Sundarbans region is under flood plain land. The land formation of south Bangladesh is not very ancient. The river Bhagirathi, the river Padma and the river Meghana newly create the configuration of land of alluvium bed of south Bangladesh. (Sen 1993:1123)

Sundarbans in Epics

For the first time the confluence of the Ganges and the Bay of Bengal or *nimna Banga* (lower Bengal) is mentioned as *Rasatal* in the Epic Ramayana (Ghosh 1993:1365; Sen 1993:1123) After Ramayana, the reference of *nimna Banga* is found in Mahabharat where the river Bhagirathi is divded into many branches. Arjun came to pilgrimage at the confluence of the Ganges and the Bay of Bengal. After bathing in the mentioned river, he went to holy place Baitarani under Kalinga (Sen 1993:1126). Apart from Mahabharat, the confluence of Ganges and the Bay of Bengal is also mentioned in the *Purana*. According to the *Padma Purana* there was a vast human habitation in this holy place and the king of Chandra dynasty named Sushen ruled there. The mentioned confluence of the Ganges and the Bay of Bengal in *Padma Purana* was in Sundarbans and there was a forest and human habitation at the time of *Purana* (Sen 1993:1127). It shows in *Chaitanya Bhagavat* that at the end of reign of Pathana and in the ruling time of Hussain Sah, there was human habitation up to Chhattrabhog of Mathurapur Thana of Dimond Harbur sub division of 24 Parganas (Goswami:285-383).

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Historical importance

Till now, no pre-historic cultural material is discovered from the Sundarbans. But the existence of Sundarbans is observed from ancient times. It is said in the third verses of the Munga and Nalanda copper plate grants of Deva Pala that Pala king Gopala conquered the whole earth up to the sea to remove *matsyanyaya* (Maitra 1963:41). It is also said in the seventh verse of the same plates that the king Dharmapala Deva, son of Gopala Deva came to the confluence of Ganges and the Bay of Bengal of *nimna Banga* accompanying with his servants to perform religious practices (Sen 1993:1129). Blochman gave references from revenue catalogue of Todarmal that there was no change towards north in between three or four hundred years in the Sundarbans because average amount of revenue in that time was nearly the same (Blochman 1873:231) Vikramaditya, father of the king Pratapaditya and his brother Basanta Ray were the founder of Jessore kingdom at the time of Emperor Akbar. Further, it was popular as the kingdom of the king Pratapaditya (Jalil 1967:54). There was also a dockyard in Sundarbans (Jalil 1967:62). The trace of a fort and a big pond named *Baniya pukur* were also there (Jalil 1967:62). The whole region, comprised of Basantapur on north to Dhumghat on south and river Arpangasia to Yamuna, was densely populated (Maitra 1963:66). The pressure of population around the Sundarbans in the early Middle Age steadily impinged on this fragmented, flooded and forested track for colonization. Many tanks, wells were dug to provide potable fresh water in this highly brackish belt as well as to raise the low lying wetland with scooping up earth from the dug up tanks. Kapilmuni is a very ancient place, is situated on the bank of the river Kapotaksha in Sundarbans. There was an image of Kali named Kapileswari (Maitra 1963:162-163). There were human habitation and small towns at some places in the Sundarbans region. The Buddhist and aborigines were the main inhabitants in this country before Muslim period. Ancient Buddhist sculptures and other cultural materials show the Buddhist existence (Jalil 1967:51). There was a Hindu civilization on the bank of the river Bhairab and Kapotakshi in Mughal period (Jalil 1967:51). Some steatite seal and punch marked coins were found in the village of Berachampa and Jakra in northern part of the district of 24 parganas nearby the Sundarbans (Banerjee:16,Sen 1993:1128) A large number of ancient bricks and terracotta plaques were also discovered from two mounds named Chandraketurgar and Baraha Mihirer Bari (Sen 1993:1128). Both are archaeological sites. Scholars are of opinions that Gupta coins from Kalighat, cruciform cellular temple of Bharat Bhayna in Keshavpur thana under Jessore district. Surya and Nrisimha sculptures of Kashipur and Sarishadaha village in Jaynagar thana under the district of 24 parganas and the ruins of Shiva temple at the village of Govindapur in 114 number lot (a parcel of land) under Mathurapur thana are dated back to Gupta period. From this evidence, it is to understand that *nimna Banga*, the coast of the Bay of Bengal, flourished during the reigns of Guptas (Sen 1993:1128). It is also known that beginning of human civilization of Bagerhat area had developed in 5th or 6th century A.D. Ruins of a cruciform and cellular temple of Gupta period has been exposed through archaeological excavation in this region. This region had also been mentioned as *Navyavakashika* (means new land) in the copper plate grants of Gopachandra, Dharmaditya and Narendraditya Samachardeva in the 6th century A.D. These copper plates have been traced at Kotalipara in Gopalganj district (Majumdar 2000:51). A gold coin of Sasanka has been found in the village Chakhar of Barishal district (now preserved in Khulna museum), which also corroborates the antiquity of this region. A dilapidated temple of about 30m height is discovered in the forest of Sundarbans at 116 number lot in the district of 24 parganas. The present name of this temple is Jatar deul (Sen 1993:1129). A copper plate grant is discovered near the temple. It is known from the plate that the king Joy Chandra built this temple in 975 A.D (Sen 1993:1128). A mound in ruins of human habitation is found in Kankan dighi of 26 number near Jatar deul. There is a similarity in between the sizes and shapes of bricks of Kankan dighi and Jatar deul. It was an important place in the Sunderban during that time. There were a number of villages and towns at coastal area in Sundarbans (Sen 1993:1130). Most probably, the human habitations of this region turned to the present Sundarbans due to natural change and foreign invasion in earlier Muslim period or at the end of the Sena reign (Sen 1993:1130). After long period of the conquest of Gaur, Muslims were able to conquer *nimna Banga*. The kings of Sena dynasty lost their possession over other parts of Banga and finally were compelled to take shelter on the east and south Banga (Sen 1993:1130). The Muslim conquered Saptagram, the main town of south Bengal, at the end of the reign of independent Sultan Rukunuddin Kaikas, middle grandson of Emperor Giyasuddin Balban of Bengal. The governor of Devakot, Baharam Itgin Jafar Khan, conquered Saptagram in 1298 A.D (Bandopadhayay 1996 :-5-6). But at that time, coastal area of south Bengal was not under possession of Muslims (Bandopadhayay 1996). In 1465 or before some time, Muslims conquered the whole of south Bengal in the reign of Sultan Rukunuddin Barbak Shah (Sen 1993:1130). Beginning of the Mughal Empire and end of the Pathan ruling, Muragachha, Kharar, Hatiyaghar and Sedanmol of Satgaon, were under northern part of 24 parganas but the southern Sundarbans was covered by the deep vegetation and it was unfit for collecting tax (Gladwin:427;Hunter:381).

The astonishing modification of Bagerhat region had been developed in Muslim period. The political gain of Islam in Bangladesh started in the beginning of 13th century A.D. During the lordship of sultan Nasiruddin Mahmud Shah of Gaur through all over Bengal in the second quarter of 15th century A.D, a saint and commander-in-chief, Ulugh Khan Jahan, established an administrative centre over Bengal namely Khalifatabad on the bank of the river Bhaira. It is known from the Arabic inscribed tomb of Khalifatabad which is located on the eastern bank of the Khanjali Dhighi about one mile south-west of Shaitgumbad mosque. He died in 1459 A.D. (Ahmad 1979:95). The Sultans used to award this royal title to those high officials who were able to attain special achievement. The Shaitgumbad mosque (48.78m' 32.95m externally) was built by Khan Jahan; is famous for its medieval muslim art and architectural style in Indian sub-continent. Other monuments of Khan Jahan are precariously surviving against the ravages of time within the ruined city area for miles around. Ranavijaypur mosque built by Khan Jahan is an important example of one domed mosque of Sultanate period. Besides these, one domed mosque near Khan Jahan's tomb, the tomb of Pir Ali Taher, follower of Khan Jahan, nine domed mosque on the western bank of Khanjali's Dighi, Singer mosque on south-east corner of Shaitgumbad mosque, Bibi Begni mosque on western bank of Ghoradighi, Chunakhola mosque of Chunakhola village, Sabekdanga monuments of Sabekdanga village are the standing monuments of our glorious history of Sultanate period in present Bagerhat region. Besides, the remaining ruins of Khalifatabad are the residence of Khan Jahan about 350ft north from Shaitgumbad mosque, a mint of Khalifatabad city on south bank of Mithapukur of Bagerhat town, thirty five domed Bara

Ajina mosque at Sonatala close to the Bagerhat town, Zindapirer mazar, Musafirkhana, Chillakhana, a large number of brick built graveyard and scattered ruins of wonderful buildings exhibit the richness of Khalifatabad city. A brick built road about one mile long and 9m-6m wide, was built by Khan Jahan, has been traced by the side of Khan Jahan's residence and to the south of ancient Bhairab, is a rare archaeological example in Bagerhat. Though the new city Khalifatabad established in 15th century A.D. but the name of Khalifatabad appeared for the first time on the coin of the crown prince Nasarat Shah dated to 1512 A.D., 53 years later than the period of Khan Jahan. Feudatory prince Isha Khan Afgan ruled over five feudal states during the time of Emperor Akbar. Probably, Khalifatabad was one of those provinces. At the end of the 16th century A.D. king Pratapaditya established his own kingdom in Sundarbans region. This region was comprised in his reign at that time. Besides these, from the architectural point of view, the Rekh Deul; Kodla Math, is situated at village Ayodhya, is an important monument erected probably in 16th century A.D. (Ahmad 1979:106). It is beautifully decorated with terracotta plaques. This region was depopulated by heavy flood in 1584 A.D. and constant plunder and killing by the Mags and Portuguese pirates. Acharya Prafulla Chandra Roy described in his biography that Muslim pirs came to preach religion in Jessore region in 14th, 15th and 16th century A.D. and then a human habitation developed there (Jalil 1967:51). Westland described in his book that Muslim pirs and priests came to Jessore for the publicity of Islam and they developed cultivated land, excavated a large number of ponds and constructed buildings (Jalil 1967:53). L.S.S.O'Maley says "the earliest traditions of the districts are connected not with any ancient Buddhist or Hindu Kingdom but with a Mohammedan called Khan Jahan Ali or more generally Khanja Ali. Local legend relates that he came here over four centuries ago to reclaim and cultivate Sundarbans which were then waste and covered with forest" (Jalil 1967:53).

Ruins of ancient buildings in the deep forest of Sundarbans

At present, Sundarban is full of deep vegetations. A number of monuments, ruins, ancient bricks and different kinds of cultural materials are found scattered in Sundarbans. Basanta Ray built a number of temples at Bedkashi during Pratapaditya (Mitra 1963:67). A ruin of an old house and its boundary wall are traced in the village of Bedkashi along with a stone pillar (Jalil 1967:55). Three brick built houses at three places and some ancient bricks are found in the village of Maharajpur under Paikgachha Thana. Ancient brick built staircase of Itakhola pond and a road have been traced in Kayra village (Jalil 1967:56). A ruin of brick built houses is seen in the jungle of Chhadankhali under Burigoalini (Jalil 1967:59). Remains of an ancient building are traced under earth on the bank of the Kachupatra River near Kshepupara (Jalil 1967:61). A broken brick built remains of a house are found in forest of Harikhali and Sindukkhali in between the river Arpangasiya and Malancha (Mitra 1963:76). There is a fort of Pratapaditya and cantonment in between Pratapnagar and Shyamnagar under Ashashuni Thana (Jalil 1967:62). The ruins of a building and a temple are traced at Ujirpur and Sainhati village near western side of Ashashuni bazaar (Mitra 1963:86). A heap of ancient bricks is found in Patkelpota on the bank of river Shivsa. There is a broken building in the forest about 32km far to the west from Raymangal check post (Jalil 1967:63). There are roads, a pond and remains of a house in the forest of Karamjali and to the west of Mongla port (Jalil 1967:64). Ruin of a house surrounded by boundary wall, is still surviving to the western side of the Sharankhola forest office (Mitra 1963:86). There was a famous Buddhist monastery at Hatiya Gar in Buddhist period (Mitra 1963:73). The famous Navaratna temple of Damreli and twelve-shiva temple stand on eastern side of Baknda (Mitra 1963:75). There was the Dhumghat Durga of Pratapaditya on northern side of Araibnakir. Its ruined structure is still there

(Mitra 1963:77). Prtapnagar and Gar Kamalpur are located between the river Kholpetua and Kapotaksha. Kamalpur was main fort of Protapaditya. There was a mud fort on northward of Kamalpur. An old pond is also there by the side of river Kholpetua. Water of this pond is soft. The water of Henkle *pushkarni* of Chhandkhali, Bedkashi *dighi* and Kalika *dighi* of Amadi is also soft (Mitra 1963:77). There are a number of ancient mementos at Kapilmuni. Some stone images were found at the place when a pond was excavated. Two of them were kept to worship at village Protapkati in the house of Rasiklal Haldar. But both of them were Buddhist images (Mitra 1963:86). Narayanpur stands on the bank of river Kayra. A Chandi image was found there (Mitra 1963:86).

Survey and exploration in the deep forest of Sundarbans

The present author went to explore the archaeological sites in some ranges of deep forest of the Sundarbans in the end of 1994 while serving Department of Archaeology. Survey and exploration reports of visited sites are given below:

Two ruins of buildings are situated side by side in the deep forest of Sundarbans in Dacop *thana* under Khulna range on eastern bank of the river Shivsa and on the northern bank of Shekherkhal and about 25km southward from Naliyan forest office. One of them is surrounded by ruined boundary wall and another one is outside the boundary. Both the ruined structures are about 5-6m above the surrounding level. Top of one of the mound is high and gradually sloping downward while the lower portion of the mound is round. Another one is two-storied building. It seems that the first mound was the ruins of *shikhara* type architecture. A large number of ancient and broken bricks are found scattered on the top and by the side of the mound. Different sizes and shapes of bricks measuring 16x14x5cm, 17x15x5cm and 17x17x5cm were used to construct the said building. Most probably, mud was used as mortar to construct the buildings and boundary wall. Basement of building is higher then surrounding area. A number of mangosteen trees (Gab tree) are seen on the mound. Such types of trees are found in residential area and it is lack of symmetry with the characteristic of the Sundarbans. Another square shaped mound is also found in the deep forest, which is located in the same area at a distance from the above mentioned site. It is about 2.5m high from surrounding plain land. A large number of broken and complete bricks are found scattered on the mound. It is observed that mud was used as mortar to build the structure. Different sizes and shapes of bricks were used to build it. The measurements of four complete bricks are 18x17x5cm, 19x14x5cm, 16x16x4cm and 21x15x6cm. A large number of used bricks of the ruined building were stolen or transferred.

A temple is located in the deep forest of the Sundarbans on eastern bank of the river Shivsa and another one on southern bank of a canal named Shekherkhal in Dacop thana under Khulna range. This temple was built on a square basement with a high plinth. The plinth is about 1.5m high from surrounding area. The cornice of the temple is curved like a bow. Outer face of the walls is decorated with panels. Two arched openings with leaf motif decoration are on southern and western wall. The pinnacle of the temple is broken. The thickness of the walls is 1.70m. Lime coating has been applied on exterior and interior faces of the temple. It is difficult to know about the type of mortar used to build the temple. Bricks of different sizes have been used to construct the temple. The dimensions of these bricks are 16 x14 x4.5cm, 16 x14 x5cm and 17 x13 x4.5cm. There is no image in the sanctum sanctorum of the temple. From the architectural features of the temple it seems to be a Shiva temple and was built between 15th and 16th century A.D.

Another mound in deep forest of the same area is located at a little distance from the above mentioned temple. The mound is 1.5m high from the surrounding area. A number of broken bricks are scattered on the mound. The bricks are of different sizes and shapes. The measurements of three complete bricks are 14 x14x4.5cm, 14x13x3.5cm and 16x12x4cm. Lime coating is noticed on brick's surface. Most probably, mud was used as mortar. A black potsherd of a dish is found on the surface of the mound. Ruins of three buildings are located near the above mentioned temple. Some black potsherds and a number of complete and broken bricks were traced on the mound. Two ruins out of three are about 1.5m high and another one is about 3m high from the surrounding area. Last mentioned mound is square in shape. Its middle portion is high and is gradually slope downward. The measurements of some complete bricks, found on the surface of three sites, are17x13x4.5cm,14x14x4.5cm, 21x17x4.5cm, 18x17x5cm, 19x13x4cm, 16x15x4.5cm and 21x15x5cm. The building is build with one fixed size of bricks. It is not possible to ascertain the type of mortar used to build the buildings. But brick surface suggest that either mud or lime were used as mortar.

A mound is located in the deep forest of Harikhali of Agraghona *thana* under the district of Satkshira in the Sundarbans. It is comparatively big and square in shape. The mound is 6-7m high from the surrounding plain. The surface of the mound is uneven and completely covered with grass and herbs. Some complete and broken bricks are found scattered on the surface of the mound. The measurements of three complete bricks are 24cmx23cmx6cm, 30cmx12cmx6cm and 21cmx16cmx5cm. Brick made structure could be exposed here after conducting an archaeological excavation on the mound. It seems from the measurements of three bricks that the structure did not build with one fixed size of bricks. It could be assumed from observation of the bricks surface that mud was used as mortar.

Another mound is found at a short distance from above mentioned mound. It is also big and square in shape and about 7m high from the surrounding plain land. The surface of the mound is uneven and completely covered with grass and herbs. Some mangosteen trees are on the site. A number of complete and broken bricks is found scattered on the surface. The measurements of three complete bricks are 21cm x 21cm x 5cm, 26cm x 21cm x 5cm and 22cm x 18cm x 6cm. It seems from the measurements of three bricks that the structure was not made of one fixed size of bricks.

At present, another square shaped small mound stands on the bank of river at a short distance from the above mentioned mound. Middle portion of the mound is high. A large number of complete and broken bricks are found on the surface. It is 1.5m high from the surrounding level. The measurements of three complete bricks are 23x20x5cm, 31x21x5cm and 21x16x4.5cm. It is understood from the measurements of the bricks that one fixed size of bricks was not used to build the structure. Mud is found on the surface of the bricks, most probably it was used as mortar. Another mound is also traced at a short distance from the above mentioned mound. It is about 3.5m high from surrounding level. A few numbers of broken bricks and some potsherds are traced scattered on the surface of the mound.

Analysis

No evidence of prehistoric age are found in the Sundarbans, but we get a number of references of antiquities of historic age. Description of the confluence of the Ganges and the Bay of Bengal as a holy place in mythological books and realm of mythological kings at that place, spreading kingdom up to the sea of Pala king Gopaladeva, religious practices of Dharmapaladeva at the confluence of the Ganges and the Bay of Bengal, a temple named Jatar Deul in South 24-Parganas,West Bengal was built in 975 A.D. by king Joy Chandra in the Sundarbans, some seals and punched marked coins from the villages of Berachampa in North 24-Parganas,West Bengal,India,and Jakra, images of Hindu and Buddhist gods and goddess from different places of the Sundarbans and revenue collection from the Sundarbans at the time of Mughal ruling, show that there was human habitation and development of human civilization in the Sundarbans.At present, surviving Shiva temple on the bank of the river Shekherkhal and Jatar deul in the Sundarbans, all discovered ruined structures of the Sundarbans, cruciform and cellular temple of Bharat Bhayana, Ayodhyar math of Jattrapur, sultanate monuments of Bagerhat and all ancient temples, mosque and mazar of Jessore, Khulna, Satkshira and Patuakhali, show very strong existence of human habitation and development of human settlement in the Sundarbans region earlier.

A number of ruined structures have been found scattered in the Sundarban. There is a possibility to discover more ruined structures after conducting a widespread exploration all over the area. Discovered structures were built with ancient bricks and probably, mud was used as mortar. It is also observed that those bricks were used in every discovered sites are not in one fixed size and shape. Some of those bricks are rectangular, some square and some geometrical in shape. The highest length, width and height of used bricks of those broken buildings on both the banks of river Shekherkhal are accordingly 21cm, 17cm and 6cm. The highest length, width and height of used bricks of those broken buildings of Harikhali are accordingly 31cm, 23cm and 6cm. So, it has come to light after doing an analysis on measurements of used bricks of explored sites of the Sundarbans that the length, width and height are accordingly into 14cm-31cm, 12cm-23cm and 3.5cm-6cm. Different sizes and shapes of bricks, usage of ancient bricks and usage of mud as mortar into discovered ruined structure of the Sundarbans show that there was a human habitation in Sundarbans in historic age.

Eight-ruined mosques of Sultanate period have been discovered after conducting an archaeological excavation at Barabazar in the district of Jhineda. At present, we know these mosques as 1.Jor-Bangla mosque, 2.Galakata mosque, 3.Satgachiya mosque, 4.Pirpukur mosque, 5.Manoharpukur mosque, 6.Nungola mosque, 7.Pathagar mosque and 8.Sukurmollik mosque. The writer of this article attended the excavation in the last five archaeological sites. He observed that ancient bricks, which were exposed from archaeological excavations, are not in one fixed measurement. Those bricks were in rectangular, square, geometrical and floral design in shape. The length, width and height of discovered bricks are accordingly into 14cm-31cm, 10cm-23cm and3.5cm-6.5cm. Mud or both mud and lime were used as mortar to built those mosques. It seems to review thoroughly the inscription from Galakata mosque, sizes and measurements of bricks and architectural feature of surviving Gorur mosque that those mosques were built in Sultanate period. There is a similarity in between the measurements, sizes and shapes of discovered bricks from Barabazar and discovered bricks from the exposed sites of the Sundarbans.

A group of striking monuments, particularly concentrated at Bagerhat but also found in some other areas of Khulna, Patukhali, Barishal and Jessore, belong to what is known as the Khan Jahan Ali style of architecture, a name derived from the saint-builder Ulugh Khan Jahan. The date of demise of the great man Ulugh Khan Jahan is recorded in an inscription on his mausoleum, as 863A.H. (1459A.D.). Shaitgumbad mosque, the largest ancient mosque of Bangladesh, is one of them. It is located in Bagerhat. The present author attended an excavation of boundary wall of Shaitgumbad mosque. He observed that the highest length, width and height of discovered bricks are accordingly into 11cm-32cm, 7cm-26cm and 4cm-6.5cm. It is also mentioned that large size of bricks had been exposed from foundation level of boundary wall and mud was used as mortar there. Near about same sizes and measurements of bricks are found in all Sultanate monuments of Bagerhat. Lime and brick-dust were used as mortar in all Sultanate monuments of Bagerhat. So, it can be assumed from construction method, architectural feature, brick sizes, measurements, ornamentation and mortar of monuments that sultanate monuments of Bagerhat were built in 14th or 15th century A.D. There is a similarity in between the measurements, sizes and shapes of discovered bricks from Bagerhat and discovered bricks from the Sundarbans.The present author also attempted to conduct an archaeological excavation on Bharat Bhayana mound. A cruciform and cellular structure of a temple had been discovered. This temple is like Lakshindarer Medh of Bogra Discovered bricks were in rectangular, square and geometrical in shape. Mud was used as mortar. The length, width and height of bricks are 10cm-38cm, 7.5cm-25cm and 3cm-6cm. Large sizes of bricks were used in foundation of the temple. Probably, it was built in 5th-6th century A.D.

It has come to light to review thoroughly on bricks of temples, mosques and mausoleums of Khulna, Jessore, Patuakhali and Satkshira of Sultanate period and the traced bricks of the Sundarbans that sizes and measurements of bricks are nearly the same. The mixture of lime and surki was used as mortar in Sultanate monuments and mud was used as mortar in most of the of the Sundarbans.

Conclusion

Now, people are not living in deep forest of the present Sundarbans but the existence of temples, ruinous buildings and artifacts represent that there was a human habitation and development of settlement in the area from 5th century A.D. to 16th century A.D. Hence it is very essential to protect the described sites and to conduct an archaeological exploration and excavation on above mentioned sites.

The author is thankful to the authorities of the Department of Archaeology for allowing him to survey and explore the archaeological sites and ancient cultural remains, which are located in the deep forest of the Sundarbans. Author is also grateful to Nimai Mandol for his cooperation.

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A Decade of Crumbling Heritage: Ayodhya (1995-2005)

B.R. MANI*

Identification and providing appropriate preservation measures for the most important heritage properties in cities like Ayodhya are required for monitoring progress with regard to current and future conservation and management initiatives and their long-term effect. This has become inevitable in view of the vanishing of seventeenth and eighteenth century buildings at alarming pace in the city, some of which having tremendous historical significance. Information about the dynamics of the resource and the changing pattern needs to be studied so that policies and approaches to conservation, curation, recording, analysis, legal matters, research and investigation can be developed against a background represented by the best possible current information.

The eternal city of Ayodhya, believed to have been founded by Ikshvaku, the founder of the Solar race of Kshatriyas after the great deluge or *pralaya* mentioned in the *Puranas* when the entire earth was flooded, is undoubtedly located on the T_2 terrace of the geological landscape, quite higher than the area all around. There is a traditional belief that Vikramditya discovered the ancient sacred places of Ayodhya. This is also mentioned in the *Ayodhyamahatmya*. However, the association and significance of imperial Guptas in the history of Ayodhya can not be just ignored as even Kalidasa writing in the Gupta period refers to the Gopratara *tirtha* as the sacred place where Lord Rama entered in the river and the citizens of Ayodhya followed him who all reached heaven:

उपस्थितविमानेन तेन भक्तानुकम्पिना।
चक्रे त्रिदिवनिश्रेणिः सरयूरनुयायिनाम्।।१००।
यद्गोप्रतरकल्पो भूत्संमर्दस्तत्र मज्जताम्।
अतस्तदाख्यया तीर्थं पावनं भुवि पप्रथे।।

(*Raghuvamsa*, 15.100 – 101)

The sacred spot of Gopratara is still known as Guptar ghat in Ayodhya nearer to Faizabad. There are allegorical references in ancient and medieval Sanskrit literature, perhaps showing a tendency of the Indian psyche to equate or trace the events and kingship with the legendary or epic heroic incidents. One such example is the medieval record of *Ayodhyamahatmya* which indicates Chandragupta II Vikramditya as the emperor who rediscovered Ayodhya and re-established the city. Hans Bakker (1986:II) believes that perhaps the Gupta emperors shifted their seat of administration from Pataliputra to Ayodhya. This event, if true, seems to have a reflection in the *Raghuvamsa* of Kalidasa where it is stated that Kusa, the elder son of Rama shifted his capital from Kusawati to the traditional capital of the family at Ayodhya after coming to know about the deplorable condition of the city of Ayodhya from the city-goddess in following words:

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वस्वौकसारामभिभूय साहं सौराज्यबद्धोत्सवया विभूत्या ।
समग्रशक्तौ त्वयि सूर्यवंश्ये सति प्रपन्ना करूणामवस्थाम ।।१०।।
विडम्बयत्यस्तनिमग्नसूर्यं दिनान्तमुग्रानिलभिन्नमेघम ।।११।।
निशासु भास्वत्कलनूपुराणां यः संचरो भूदभिसारिकाणाम ।
नदन्मुखोल्काविचितामिषाभिः स वाह्यते राजपथः शिवाभिः ।।१२।।

(*Raghuvamsa*, 16, 10-12)

Kusa was also informed that the multi-storied mansions of Ayodhya which used to glitter in moonshine earlier have become deprived of it as their white colours of lime-wash have faded and turned black due to no care and repair and they have been overgrown with vegetations:

कालान्तरश्यामसुधेषु नक्तमितस्ततो रूढतृणाङ्कुरेषु ।
त एव मुक्तागुणशुद्धयो पि हर्म्येषु मूर्च्छन्ति न चन्द्रपादाः ।।१८।।

(*Raghuvamsa*, 16.18)

Kusa decided to shift the capital and marched towards Ayodhya:

कुशावतीं श्रोत्रियसात्स कृत्वा यात्रानुकूले हनि सावरोधः ।
अनुद्रुतो वायुरिवाभ्रवृन्दैः सैन्यैरयोध्याभिमुखः प्रतस्थे ।।२५।।

(*Raghuvamsa*, 16.25)

The act of Kusa, shifting the capital, seems to be repeated by the Gupta emperor Chandragupta II as evidenced in the *Ayodhyamahat*mya wherein the latter is credited to have re-established the city. There is another comparable likeness between the two emperors that while Kusa married the *naga* princess Kumudvati, Chandragupta Vikramditya also married Kuveranaga, a *naga* princess who is mentioned in the Poona Copper Plate inscription (Sircar 1965:436). It seems that in the later part of early historic period the shrine of Nagesvara emerged at Ayodhya near the *Svargadvra* bank of Sarayu celebrating the legend of Kumuda and Kumudvati the nga prince and princess with former having been subjugated by Kusa. The shrine is mentioned in the *Ayodhyamahatmya* and it is believed (Hans Bakker 1986:II, 97) that the original smaller shrine was replaced by a new one during the period of the rule of Safdarjung as Nawab of Awadh by his *diwan* Nawal Rai in the fifth decade of the eighteenth century AD.

It is shocking to mention here that during the span of a decade's time the common heritage of Ayodhya has been continuously crumbling to a great extent. The *pitha* of the Nagesvara *linga* which is undoubtedly the lower part of an Asokan column with upturned inverted lotus decoration all around it and having socket for fixing the tenon of the shaft now enshrined with the Siva linga. The first photograph (Pl. 1) was taken with its full view in 1995 when I was carrying out an inspection of some of the sites in Basti district jointly with the officers of U.P. State Archaeological organization.

It was informed that during Sivaratri celebrations in 2003 the entire pitha was covered with decorated silver sheets and no one can have a look of the Mauryan polished Chunar sand stone part of the Asokan column now onwards. The latest photograph (Pl.2), taken in 2005, shows the changed look. It is not clear whether the silver coverage of the part of Asokan column is intentional or created out of devotion to the Lord.

Very few people know that the earliest Sanskrit inscription in Brahmi script belonging to Dhanadeva, mentioning his pedigree as sixth in the line of *senapati* Pushyamitra, the great Sunga emperor who performed *asvamedha* sacrifice twice in his life, is studded in the door-sill of the temple complex of Ranopali, near Maniparvat in Ayodhya. The Brahmi letters of the early first century B.C. show some wear and tear during the decade's time as it is clear from the photographs of 1995 (Pl.3) and 2005 (Pl.4). All efforts with local administration to acquire and place the inscription in safe custody have proved futile since its discovery around a century ago.

But the most pathetic story is that of the mosques constructed by Aurangzeb at Svargadvara area. Both the mosques were constructed probably at the places where once stood the temples of Dharma-Hari and Chandra-Hari respectively which were shifted later in the nearby area. The former place was also dedicated to Treta-ke-Thakur and the mosque with brick masonry having typical Mughal style of mosque architecture with arched entrance at the façade was visible along with decorated mouldings and squinches in 1995 (Pl. 5) when the site was first visited by me. Its beautiful art work and its gigantic location on an ancient mound were extremely attractive. Within next ten years when the site was visited in 2005 (Pl. 6), it shocked me as I found that the entire façade has collapsed and the squinched arches are no longer in existence, only two side parts tell the story of once a grand mosque which has suffered great loss and is on the verge of disappearance due to negligence of not only the stake-holders but also the general public which is more interested in the temple-mosque issue of Ayodhya rather than paying any attention towards such crumbling heritage which could have been proved to be of much archaeological and historical significance.

One of the towers along with the structure of the other mosque has also fallen and the present state of the mosque (Pl. 7) is so alarming that it may collapse at any time if no proper care is taken for its conservation. These structures in Ayodhya were never considered to be of national importance and thus Archaeological Survey of India could not have any control over them. But it does not mean that the structures do not have historical, artistic or archaeological importance. However, till date no other agency has come forward to preserve them.

Amongst large monuments, the Hanumangarhi has undergone considerable change in 2003-04 when the entire old plaster has been replaced with pink sand-stone cladding over the outer walls of the fortified temple complex.

The condition of the urban enclave at Ayodhya is nowhere better. It seems there is no control over demolition of seventeenth and eighteenth century houses and public buildings. The population increase and growth in family size together with the tendency to imitate modern way of life has added to the loss of heritage buildings which are being replaced by ugly structures (Pl. 8) in cement brick masonry. The existing heritage buildings are not maintained and those which get some attention by the owner or the stakeholder get their shape completely changed, not even preserving at least their façade. There are series of heritage buildings with typical period decoration of eighteenth-nineteenth century on the road sides, particularly on Ayodhya-Basti main highway, passing through the city (Pl. 9) as well as on the river-front (Pl. 10) which could be easily retained by enforcing state laws to at least maintain their façade in their original form and thereby declaring them as heritage buildings even if they are not declared as protected monuments by either central or state government.

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Archaeological Research at Sisupalgarh 2007: An Early Historical City in Orissa

R.K. Mohanty*, M.L. Smith**, T. Matney***,
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Sisupalgarh, a fortified Early Historic city in Orissa was initially excavated in 1948 and 1950 by B.B. Lal (Lal 1949: 62-105; 1991: 5-21). After a gap of more than 50 years, research began at the site in 2001, which included systematic survey and a mapping programme (Smith 2002 a: 139-151; 2002b:109-125; 2005: 297-306) as well as excavations and geophysical survey (Mohanty and Smith 2006a: 27-32; 2006b:48; Mohanty, Smith and Matney 2007:54-59). The present project was designed to investigate the process and nature of growth that has given rise to this urban centre and to know how it sustained it's economic and social perspective from the evidence retrieved in the form of remains of ordinary household refuses. The results of the third season of excavation along with new geophysical survey data and topographic mapping have been presented in this paper.

Fieldwork was conducted from December 2006 to February 2007 jointly by R.K. Mohanty and Monica L. Smith under the permission from the Government of India and in collaboration with the Archaeological Survey of India (Fig.1). Excavations were undertaken in five areas: 1) an extension of the habitation area Operation 3 first excavated in 2006; 2) a trench across the rampart that also connected the habitation area of Operation 3 to the site exterior; 3) a trial trench on the eastern side to examine the results of the geophysical work; 4) a trial trench in the area of monumental architecture at the center of the site; and 5) a portion of a deep sounding in the central area.

The ancient urban core of Sisupalgarh is defined by a rampart and moat that encloses an area of 130 ha. The rampart is well-preserved and still stands up to 9 m high, enclosing a formal square shape with eight gateways regularly spaced along the four sides. Monumental architecture at the site includes standing stone columns and stone-lined ponds in the center of the site. Research outside the rampart area indicates the presence of other structures in the immediate vicinity (Ota 2007: 67-73).

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Topographic Mapping

The site of Sisupalgarh is very large (over 1 km^2) and presents significant challenges to traditional approaches to topographic mapping. These challenges include archaeological topography itself as well as modern phenomena/features such as the presence of trees and other obstructions to line-of-sight viewing. To make a topographic map efficiently that would also serve as a base map for the location of all project activities, we made use of a Trimble brand Pro-XRS receiver with Trimble Recon Handheld Data logger and Trimble GPS antenna. The equipment works in the manner of a conventional GPS but with enhanced accuracy of the vertical (Y-axis) measurement. In the field, data was captured as a series of vertical and horizontal (X, Y, Z) coordinates, which were then be downloaded directly to a computer equipped with GIS (Geographic Information Systems) software. Because there are no nearby base stations for GPS work, the use of the instrument at Sisupalgarh required satellite subscription which had to be paid for.

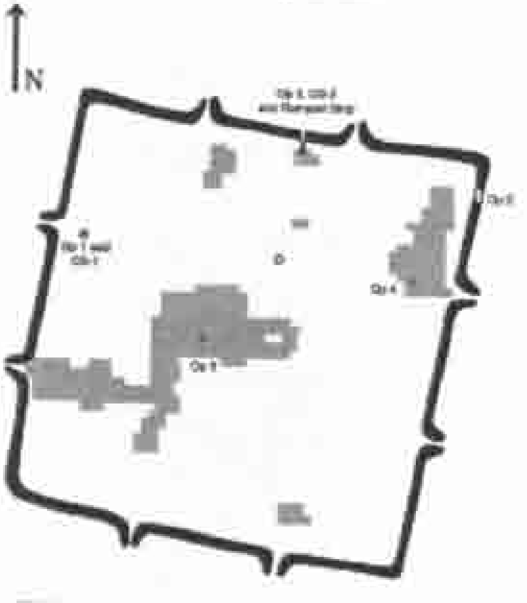

Fig. 1: Areas of excavation (black squares) and geophysical survey (shaded), 2005-07. Small circle in the north-central portion of the site is the well.

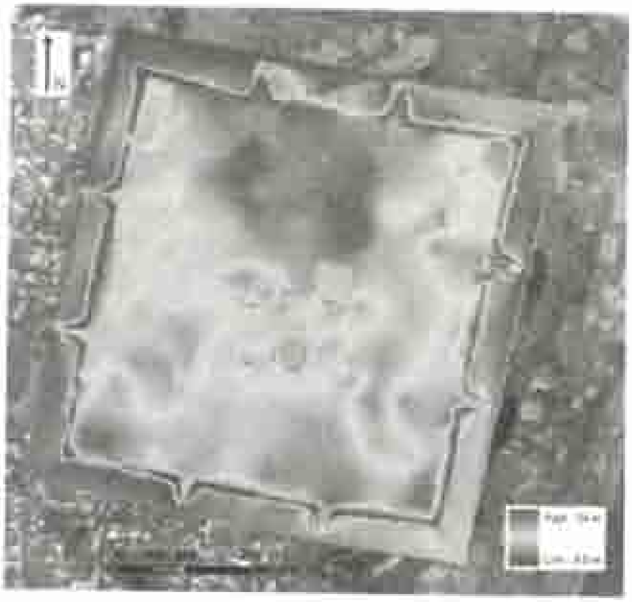

Fig. 2: Topographic map of Sisupalgarh generated by Trimble GPS, superimposed on Google Earth image.

The instrument was utilized by walking to the topographic point of interest, turning it on, and selecting the appropriate buttons to collect and log the data point. While in principle this can be accomplished by a single person, it was found to be useful to have three individuals in a team. One person (team leader) identified the places on the ground where readings would be taken, and placed a small wire-and-plastic "pin flag" at the spot. The second person (a student) carried the instrument, walked to each point in succession and took the reading. A third person (a local villager) was engaged to clear brush, move branches, and provide general logistical support for the mapping process. This teamwork enabled all of the students working on the project to gain experience with this technology, and at the end of each day of data collection they were also engaged in the downloading of the data and the incremental creation of the map over the course of the project. Fig. 2 shows the completed topographic map of the site.

Geophysical Survey

Geophysical techniques work on the principle that buried features, such as walls and pits, have different densities and emit different magnetic and electrical properties. While geophysical survey is not a substitute for excavation, it can indicate presence of subsurface anomalies and regularities that can enable the investigator to place excavated areas in a larger context for interpretation. The device utilized for the magnetic gradiometry survey at Sisupalgarh is a Geoscan Research FM-36 Fluxgate Gradiometer. The geophysical survey was undertaken in 2007 as an extension of the successful 2006 work, when magnetic gradiometry revealed presence of long linear features emanating from the site's recognized gateways (Mohanty and Smith 2006a: 27-32; 2006b:48, Mohanty, Smith and Matney 2007: 57-66). Mapping of additional areas was sought in 2007 to expand on these results and to test whether the linear features (possibly roads) were present elsewhere.

The use of subsurface investigation is critical for evaluating theories of urban organization. At large archaeological sites, standard techniques can reveal a great deal of information about ancient life at the smallest scale (through the excavation of households) and at the largest scale (through systematic survey and mapping of the entire site). However, there exists an "intermediate size" neighbourhood component that integrates households and serves to subdivide and organize urban centres. By placing excavated areas into context and presenting the full lay-out of neighbourhoods, geophysical survey provides a new type of data for understanding urban configurations.

Three areas of geophysical survey were carried out in 2007. In the northeastern portion of the site, a large area was investigated to determine whether we could detect any linear anomalies ("roads") coming in from that gateway (Fig.3). This area on the northeastern interior of the rampart was also of interest because of the excavation (Operation 2) undertaken on the top of the rampart in 2005 and because of the presence of what appeared to be "crop marks" of architectural remains visible in the dry season. The availability of many contiguous, empty rice fields also provided ideal conditions for geophysical data collection. The gradiometry results in this area indicated presence of several linear features that could be identified as roads or passageways, and that there was a significant, large linear anomaly that leads inward from the eastern gateway. This area was also chosen for a trial trench to link the geophysics results with subsurface features.

A small area was examined through geophysical

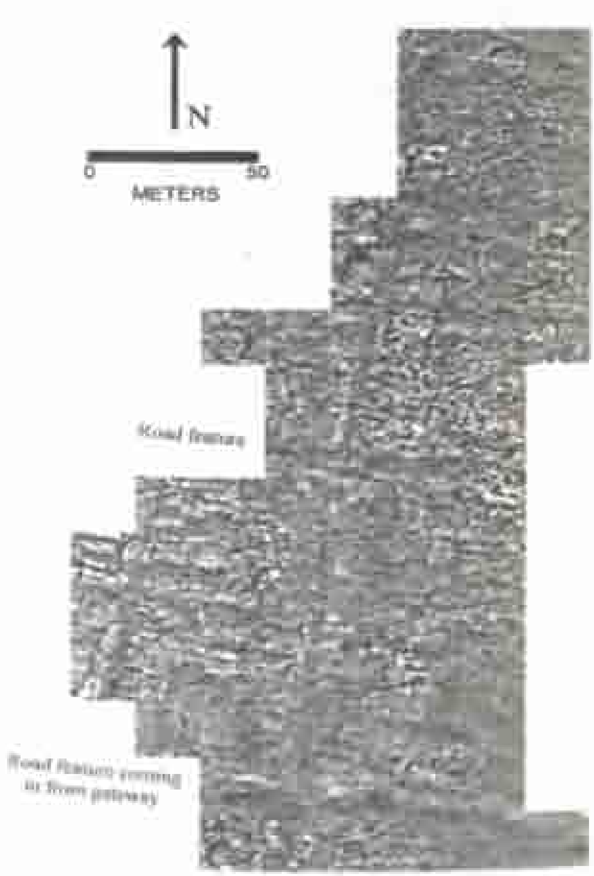

Fig. 3: Magnetic gradiometry survey of the northeastern portion of the site, showing linear anomalies (probable roads) on the interior of the gateway.

survey north of the easternmost southern gateway to determine whether there was also a north-south road leading in from that gateway. Although the area investigated was relatively small (fifteen 20 x 20 m grid squares), the readings confirmed presence of a linear anomaly in the predicted alignment. We now have sufficient data to prove existence of major linear features (roads) criss-crossing the site and leading to each of the eight gateways, confirming a hypothesis proposed long ago by Lal (1991:18-19). The most extensive geophysical survey area was in the central area near the monumental pillars (Fig. 4). The investigation of five hectares revealed the presence of a very large rectilinear perimeter area measuring 120 x 160 m around the monumental columns. The lay-out of this feature suggests the presence of what we may call a "palace precinct" in which the monumental columns are surrounded by a large perimeter area reminiscent of an administrative complex or royal court. Further investigation and ground-truthing verification in this area is of utmost urgency as the area is beginning to be impacted by modern construction.

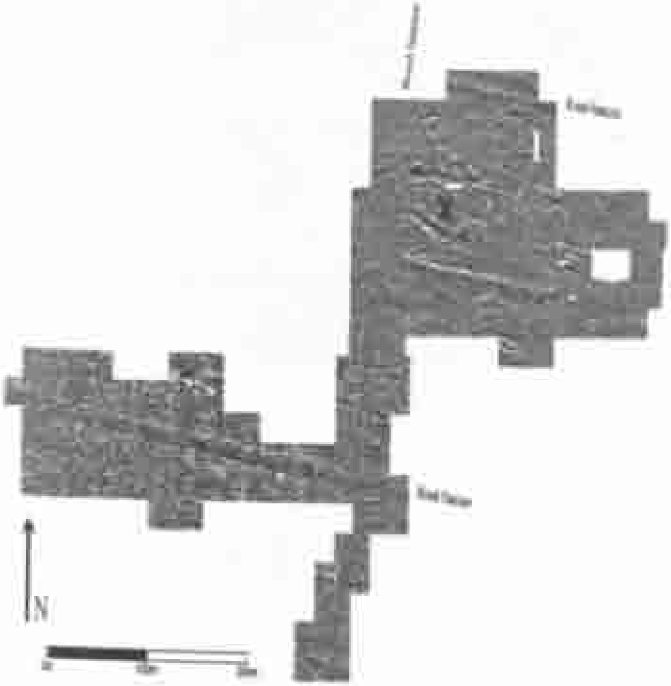

Fig. 4: Magnetic gradiometry survey of the central portion of the site, showing linear anomalies coming in from the gateway and linked to a rectilinear "palace precinct." The pillar mound is marked with an X.

Excavation: Operation 3

The major excavation area in the 2007 season was carried out in the northern portion of the site as a continuation of Operation 3 from the 2006 season. We reopened the excavations that had been refilled in the interim to protect the architecture, and expanded the trench to a total of 13 x 25 m. The open excavation area was excavated to various levels this season, with a maximum depth of 3.42 m below modern ground surface.

Operation 3 produced two distinct areas of architecture: three structures that could be identified as "houses," and open areas of fragmentary walls and pavements that appear to have been multiple-use outdoor areas (Fig.5 and 6). The abundance of pottery in the northern portion of Operation 3 indicates that this was probably an open-air use zone in which trash deposits were interspersed with areas of carefully-laid pavements of broken tiles that could be kept relatively dry and clean. These trash-deposition patterns, even in close proximity to structures, indicate association of many types of outdoor use-areas with ancient habitations even within a city where "open" space may have been quite scarce. A number of small formal pits and informal "slumps" cut through underlying pavements and represented the uppermost phase of use. Some of these pits had relatively high pottery densities, but most had only a very loose, gray fill without artifacts.

Excavations in Operation 3 in 2006 and 2007 indicate that site-formation processes at Sisupalgarh have had a dramatic effect on the preservation of cultural features (cf. Schiffer 1987). The densely-packed encircling rampart acts as a holding basin for water, which in the monsoon climate appears to have obliterated fine-scaled traces of human activity. Support for the hypothesis of extreme weather-related decomposition comes in the observation of a very sticky, gray-green-yellow clay seen as thin lenses (e.g. 0.5 to 2 cm) in many portions of Operation 3 that are likely to have been the result of long-term water accumulation. The site's elevated water table also means that in archaeological excavations we typically encounter water between 1.5 and 3.0 m below modern ground surface, although the cultural deposits continue for at least three m additional below that point.

As in 2006, we noted that the uppermost architectural elements of Operation 3, located in the top 60 cm of the trench, consisted of laterite block features and brick features. The blocks were irregularly shaped and of various sizes, ranging from 30 x 40 cm to 60 x 110 cm each. In some cases a layer of bricks was preserved on top of the laterite blocks. The bricks and stones consisted only of a foundation for an upper structure made of earthen materials, similar to the existing (pisé) reused structures found in nearby villages even today. The uppermost phase brick architecture was heavily damaged in some areas, suggesting that it was exposed to these elements for a long period. In these upper deposits, nearly all of the bricks and tiles were reused materials of irregular size and very few complete bricks or tiles were recovered.

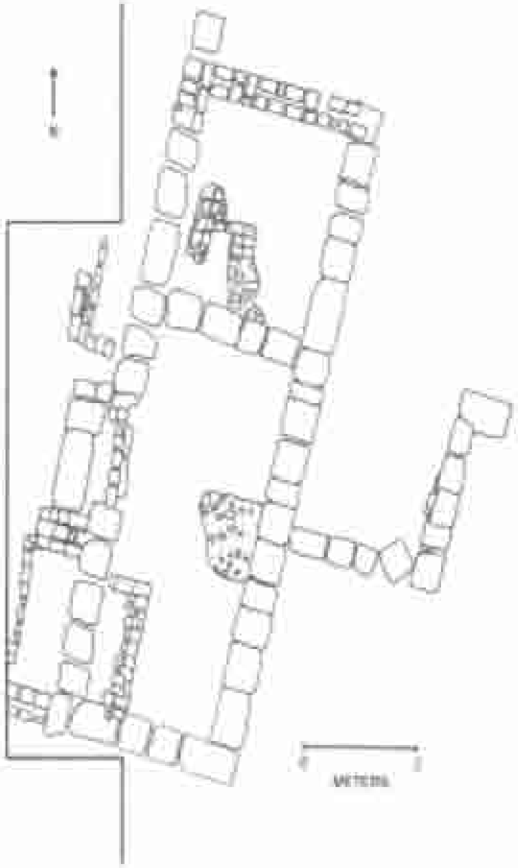

Fig. 5: Single-layer laterite block and brick foundation of a structure, Operation 3.

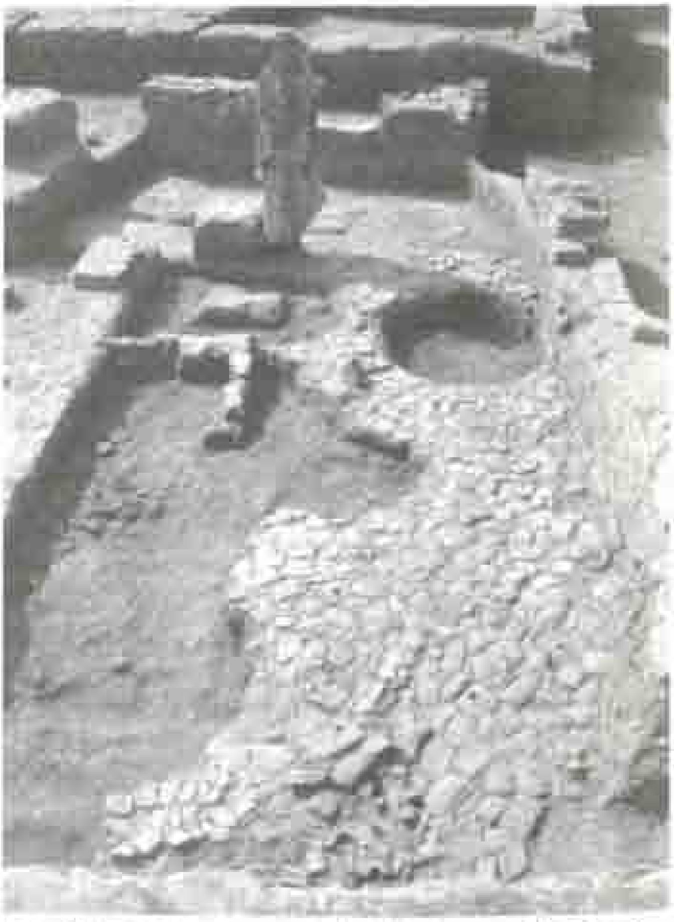

Fig. 6: Flattened-tile pavements in the habitation area, Operation 3. View to N.

In the excavated habitation area, there are no traces of hearths or storage areas, and flattened areas suggestive of floors are extremely rare (traces of floors or living surfaces are also absent in the sides of the trench where they might be expected to have been preserved as ephemeral features in the sections). In the exterior areas of the structures at the upper levels, we have only the most durable forms of trash, namely pottery, and no evidence for the discard of organic material such as bones or grains; nor are there remains of charcoal as we would expect from cooking fires. Human factors of recycling in ancient times also had an effect on site deposits. For example, the use of mud and earth in pisé architecture meant that walls decompose back into amorphous mud, which was then recycled back into new architecture relatively easily. The foundations themselves often consisted of reused materials, such as broken bricks, or odd-sized laterite blocks that may have been opportunistically scavenged by the ancient inhabitants from many different locales.

In the area between structures, we recovered a distinct and unusual deposit at 2.1 m below modern ground surface (locus G42, Fig.7). This deposit consisted of a complete shed deer antler measuring 58 cm long, along with several up-facing pottery cups and bowls, a metal finger-ring, an iron fragment, and a glass bead. It is interesting to note that this is the only purposeful deposit of material that we have otherwise encountered in the habitation area and that too in an area that otherwise has contained no architecture. After the phase in which the antler cache was deposited, this area (located between two structures) sustained a long period as a kind of dumping ground as indicated by the presence of large sherds.

As we descended in the Operation 3 trench, there was a stratigraphic layer in which there was better-constructed architecture and a greater diversity of material goods. This stratigraphic layer, encountered in the 2005 deep soundings on the western side of the site and the 2006 deep sounding on the northern side, also marks the transition in pottery types (from carefully-made pottery to a more expedient type of pottery production, perhaps indicative of an economic boom that changed pottery from a carefully-curated

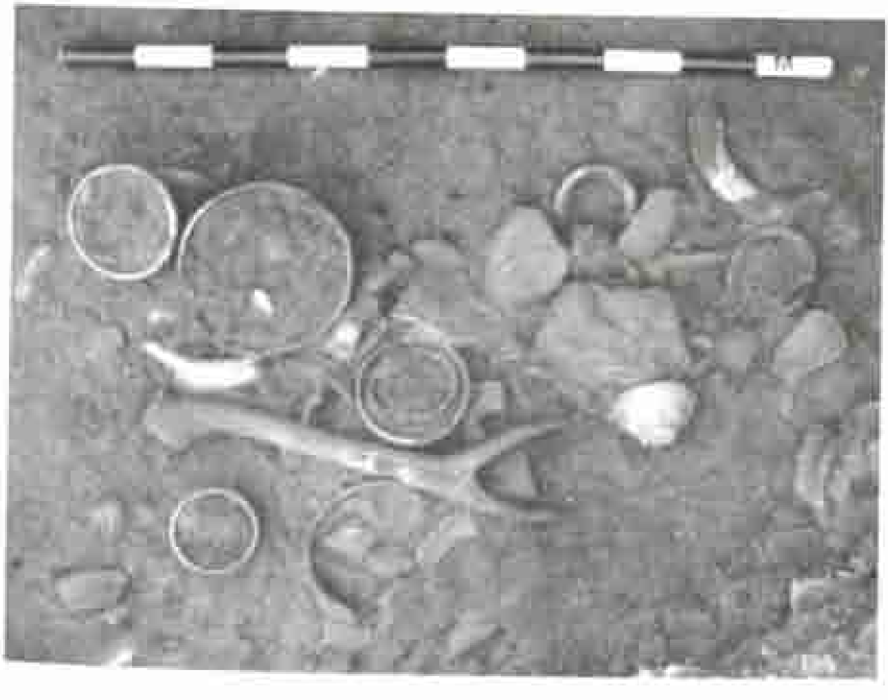

Fig. 7: Antler cache in trench G, Operation 3.

household item to being made in such quantity that it was essentially disposable). Unfortunately this is also the same level at which the water table is encountered, meaning that the full exposure of these deposits is unlikely at the site.

The pottery from the area of Operation 3 was in general similar to the types of materials recovered from Operation 3 in 2006, i.e., oxidized (red) sandy wares with rapid decorations such as appliqué thumb-print and rope designs. The pottery comes in a limited range of shapes: small jars, medium-sized jars, large jars, bowls with a thickened rim, bowls with a ledge rim, and large quantities of string-cut cups. These cups rarely had any use-wear, indicating that they were probably discarded within a short time of their manufacture. A study of rim diameters from the loci with large quantities of pottery indicate that the forms were not likely to have been standardized but instead were made in a wide variety of sizes, as suggested in (Fig.8).

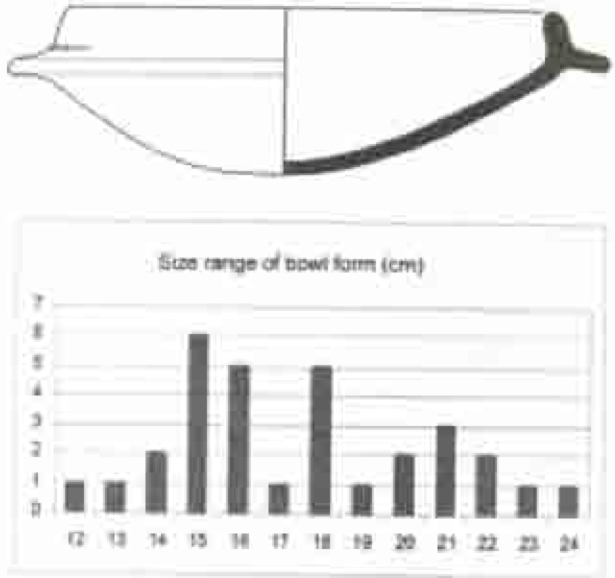

Fig. 8: Example of bowl form common in the upper levels of habitation, Sisupalgarh, with the size range illustrated from locus F44, Operation 3.

Excavation: Rampart Strip

As the area of Operation 3 was relatively close to the rampart, we undertook the opportunity to link the habitation deposit with the rampart. The trench measured 2 x 55 m and was separated from the far northeastern corner of Operation 3 by a narrow baulk of 1.5 m. The trench across the rampart was excavated to various levels with a maximum depth of 3 m below ground surface (interior of the rampart) and 4.67 m below ground surface (exterior of the rampart).

The water table was encountered on the interior of the site at 3 m below the modern ground surface; due to time constraints the excavation of the exterior of the rampart was terminated without reaching the water table. It should be noted that we did not reach a confirmation of natural soil anywhere in the rampart strip (either the interior or the exterior of the rampart). Moreover, even at the deepest levels of excavation this season the original exterior of the rampart appears to have been much lower than it is today and on the outside of the rampart there were iron objects and tiles even 1m below the level of the adjacent agricultural field. Any calculation of the rampart volume for purposes of understanding ancient labour investment needs to take into account components of the rampart that are today buried underneath the surrounding fields.

The rampart trench revealed at least three building phases of habitation structures and three substantial building phases of the rampart itself interspersed with periodic episodes of earthen fill. In the interior of the rampart, structures were found similar to those in the adjacent habitation area, consisting of laterite blocks and broken bricks as well as pavements of tile fragments (Fig. 9). There were no habitation structures on the exterior of the rampart, although the fill of the rampart did contain pottery fragments (in very small densities) throughout.

The initial phase of rampart construction consisted

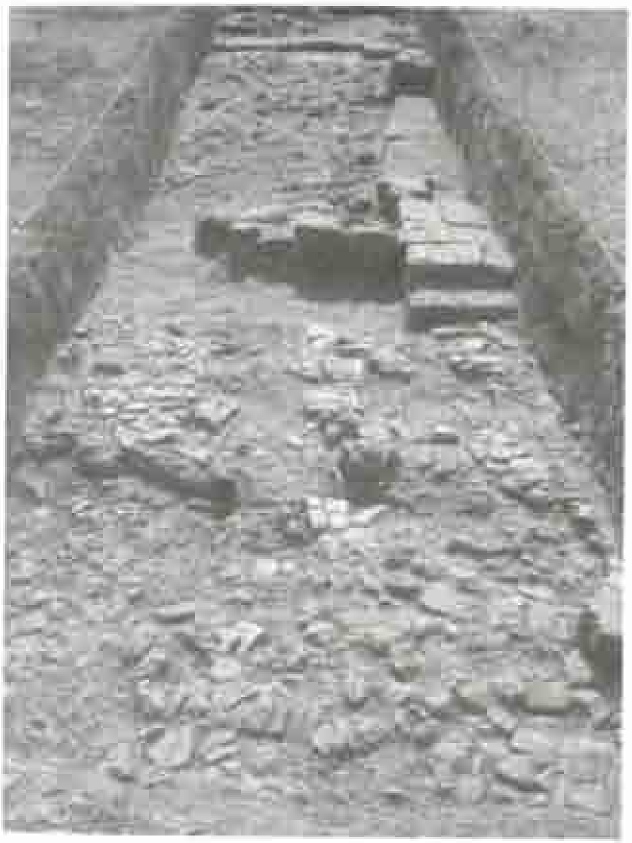

Fig. 9. Architectural remains and tile pavements on the interior of the rampart, representing a continuation of the habitation area. Trench measures 2 m wide. View to S.

of a very compact clayey fill, at times with the kind of dense, sandy nodules seen in the deposits of virgin soil at the bottom of the deep soundings of 2005 and 2006. However, for constructing the rampart this clay had been mixed with artifacts, consisting mostly of small sherds of burnished oxidized and reduced wares that date to the first half of the site's occupation. There did not appear to be any dumps or pits of pottery on the rampart itself; instead the pottery was mixed in quite thoroughly with the clay deposit. Over this rampart of clay was a second phase of construction, consisting of a very substantial and well-built brick wall of which thirteen courses were preserved (Wall DD27, Fig. 10).

The final phase of rampart construction consisted of a wall of reused bricks (wall DD4) in a relatively poor quality of construction preserved in five courses (Fig.11). The earthen fill that was interspersed with these features contained the same types of pottery as in uppermost habitation deposits. Thus, the rampart appears to have been constructed and maintained in many episodes that corresponded to the phases of site occupation in general. The presence of domestic debris such as iron fragments, quartize cobbles, sandstone fragments up to 20 cm in size, charcoal flecks and pottery indicate that the augmentation of the rampart was done with domestic debris on some occasions, and not simply with dredged up natural deposits from the exterior moat. This may even mean that the rampart itself was relatively easy to pass over from the top, and that on a regular basis (perhaps every few years) there was a labour programme in which residents added a layer to the rampart exterior.

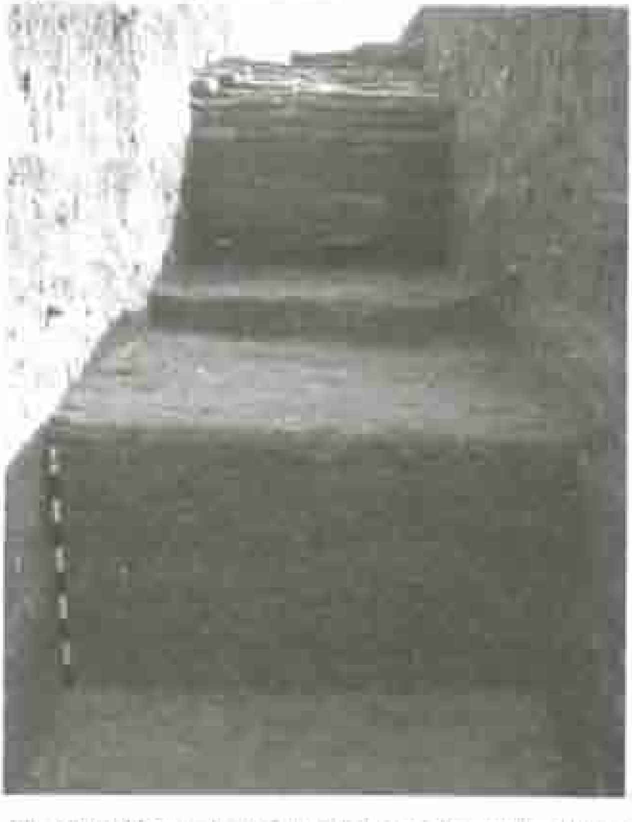

Fig. 10. Architectural remains on the top of the rampart, viewed from the exterior. Trench measures 2 m wide. View to S.

Operation 4: Trial Trench to Investigate Geophysics Results

The geophysical survey undertaken at Sisupalgarh in 2006 and 2007 showed significant subsurface anomalies that appear to represent different types of architectural patterns. Ground-truthing of geophysics results is extremely important for analyzing and checking computer-generated results of the survey. This generally consists of small follow-up excavations to determine how the anomalies detected by the remote-sensing device correspond to subsurface features. Another reason for ground-truthing is that each site will have different depths to which the equipment may read subsurface deposits.

One trial trench measuring 2 x 10 m was placed on the eastern side of the site in the area directly over the linear anomaly detected by the magnetic gradiometry survey (Fig.12). The quantity of ceramics, bricks, tiles and other artifacts measured in kg/m³ was extremely small compared to other excavated areas. No structures, pavements or architectural remains of any kind were recovered. At the end of the trial trench exposure, a smaller area measuring approximately 1 x 1 m was excavated further until the water table was encountered at approximately 1.5 m below modern ground surface. So far this is the highest occurrence of the water table encountered by our excavations at Sisupalgarh.

In sum, the area of the Operation 4 trench was considerably more "empty" than any similarly-sized area in the habitation areas excavated at the site. It appears, then, that the magnetic gradiometry process at Sisupalgarh is registering 'negative' or 'empty' space rather than a specific type of construction. Some support for this interpretation is also provided by the gradiometry results from the northern area prior to the placement of Operation 3. There, the survey suggest a similar negative space that corresponds to the area of trench G, the only large space in the Operation 3 excavation area where there were no architectural remains and relatively few stray architectural fragments such as bricks or tiles.

Portion of a Deep Sounding in the North-Central Area

During the 2007 field season, one of the local workers noted that a new well being dug in the village by a resident was producing finds that included a handful of charred grains. The landowner graciously allowed us to intervene and collect data from the lowest portions of the well, which gave us valuable comparative data for deep soundings excavated by our team on the western side of the site (CS-1, 2005) and on the northern side of the site (CS-3, 2006). The well measured 1.25 m in diameter, considerably smaller than our purposeful deep sounding excavation trenches, but

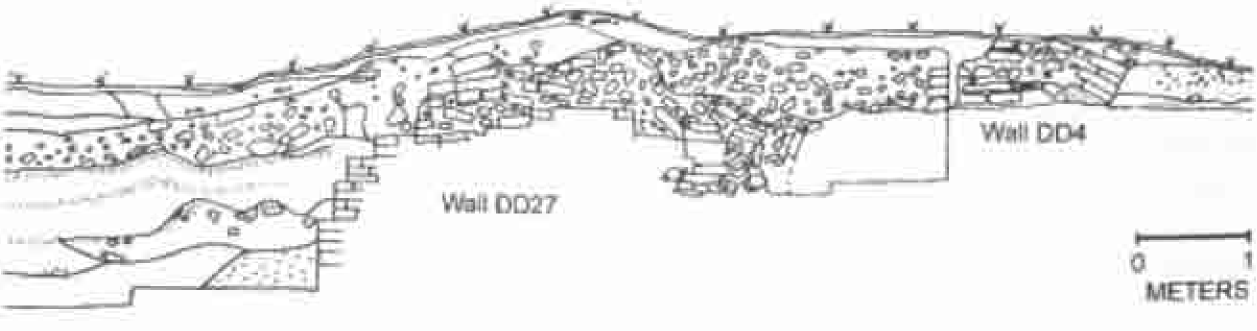

Fig. 11: East section from top of Rampart Strip excavation, showing the robust wall DD27 and the uppermost wall DD4.

the excavation was carried out in the same manner as was case in the 2005 and 2006 deep soundings. However, our team began excavation of the well at 6.8 m below modern ground surface, and was divided into "splits" measuring 40 cm in thickness down to a maximum depth of 8.15 m below modern ground surface when the evidence of cultural material was no more found. All of the materials were collected and washed on a 2 mm size screen. To confirm that virgin soil had been reached, a bucket auger was utilized for another 92 cm to produce a 10 cm diameter probe of the subsurface. The ceramics and other materials (including at least one wooden fragment) are still under analysis, but the ceramics are comparable to the lowermost portions of the deep soundings undertaken in 2005 and 2006, that is, slipped and burnished ceramics in oxidized and reduced wares.

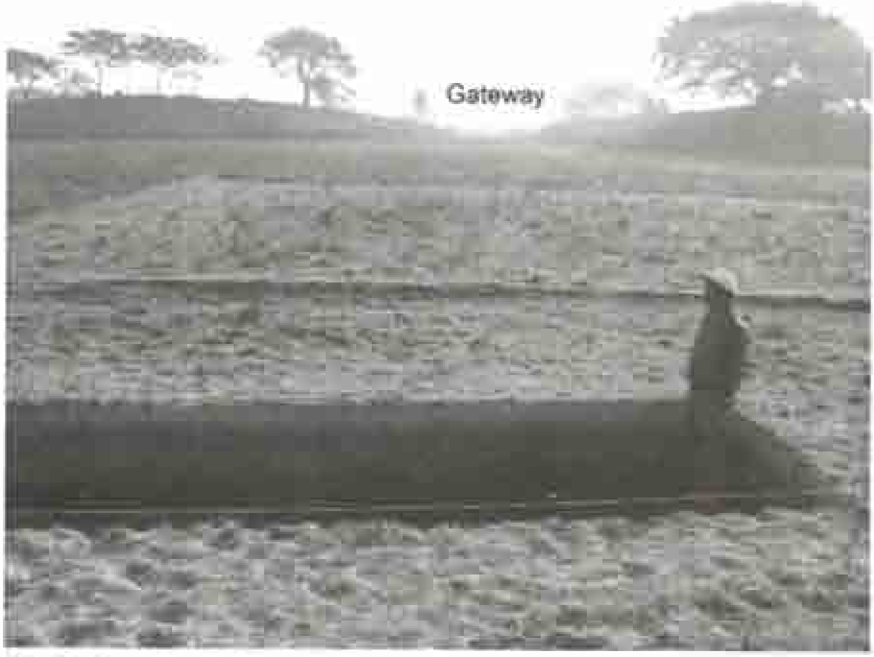

Fig. 12: Operation 4: trial trench for ground-truthing of magnetic gradiometry results. View to E.

Operation 5: Trial Trench in the Area of Monumental Columns

The monumental column area of Sisupalgarh presents an enigmatic and compelling subject for archaeological research. At present, there are fourteen standing pillars (of which one is truncated), standing up to 4 m in height above the surrounding plough zone. Towards the end of the 2007 field season, we placed a 3 x 3 m test trench on the upper portion of the mound, with the trench corners on two large laterite fragments that were visible prior to excavation. The upper loci each had several hundred quartzite pebbles in the 2-3 cm size range, but very few potsherds. At 60 cm below the top of the mound, laterite blocks were confirmed to be pillars squared off with a small notch, similar to the standing pillars to the north (Fig.13). The base of the pillars in the trial trench on the mound is at the same height as the base of the pillars that are now in the adjacent flattened agricultural area. The distance between the two columns excavated in the trial trench is 1.4 m, smaller than the distance of 1.9 to 2.3 m that separates the intact standing group of pillars. However, the recovery of these two new pillars, which raises the total of known pillars to sixteen, indicates that there are probably many more such pillar fragments. The pottery from Operation 5 is still under analysis, but it is overwhelmingly characterized by oxidized wares in very fragmentary condition of the type that are common in the uppermost deposits of the habitation areas at the site.

Analysis of Artefacts

The principal aim of the ceramic sorting for all of the excavation areas was to record the shapes of vessels and types of decorations which would enable us to identify economic practices at the household level. The pottery recovered in 2007 upheld the previous observations of a significant shift in the ceramics over time at the site. In the first half of the site's occupation, the ceramic corpus consists of high-fired, burnished wares of both oxidized (red) and reduced (gray/black) finish. This material is replaced at about halfway through the site's stratigraphic profile by rapidly made, low-fired unburnished wares with expedient decoration and a range of new bowl forms including string-cut cups.

This year's excavations in the northern portion of the site also produced some very unusual pottery fragments. One is a single piece of deep green glaze ware, recovered in locus AA8 of the rampart strip (at a depth of approximately one meter below modern ground surface). The other unusual find is the recovery in Operation 3 of several fragments of a highly micaceous ware of a type that is typically found in the Vidarbha region of central India. It is the first time that either of these two very distinctive ware types have been reported from Sisupalgarh.

The majority of antiquities from Operation 3 and from the interior of the Rampart Strip consisted of terracotta ornaments in various forms: beads, bangles, pendants, rings and earspools. Most of these finds were very small, broken and/or abraded, making specific identification difficult. Better preservation of finds was noted as we proceeded downwards in the area of structures found in the Operation 3 habitation area, including a well-preserved terracotta pendant of a bull (Fig.14). Small finds in Operation 3 also included several stone bead fragments, and a small number of iron artifacts such as nails.

Economic activities also were suggested by the differential distribution of natural objects and waste products. Quartzite pebbles in the 2-4 cm size range were found in great abundance in some portions of the site, including areas near the rampart and on the pillar mound. As small, portable objects that would have been brought into the site, they may have served as a kind of marker or token. Another type of artifact that may have served as a marker or counter are the small circular punch-outs from tile manufacture that similarly appear in concentrations in some portions of the excavation area. Because these items are manufactured goods and would have required high-temperature firing, they would not have been easily counterfeited and may have had a controlled or monitored distribution.

Animal bones were found in extremely small quantities for the most part. A preliminary field analysis by Dr. P.K. Thomas in the course of the 2007 season indicated that there

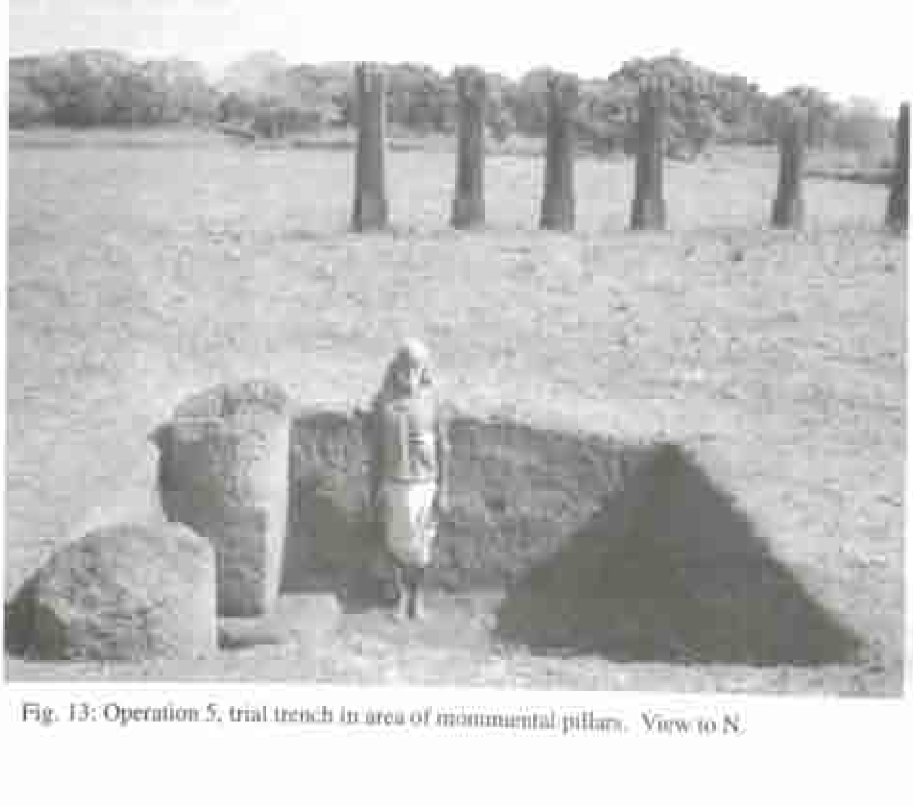

Fig. 13: Operation 5, trial trench in area of mommumental pillars. View to N.

is a representation of wild *Bos*, deer, wild boar, land turtle, and freshwater turtle. Botanical samples were taken throughout the trench and analysis of these materials is ongoing.

General Summary and Conclusions

The 2007 geophysical survey, topographic mapping and excavation at Sisupalgarh provided new information about habitation uses and monumental architecture at the site. The geophysical survey enabled us to acquire information about architectural lay-outs in areas much larger than conventional excavation could expose. These surveys show that significant anomalies appear to correspond to "empty" spaces, such as long linear roads and open spaces among buildings. In the area of the central pillars, the geophysical survey has shown the presence of what appears to have been a substantial "palace precinct" surrounded by roads and with a large open courtyard. The geophysical survey in different portions of the site also supported the hypothesis of a grid pattern of major linear features, probably roads, coming in from the formal gateways.

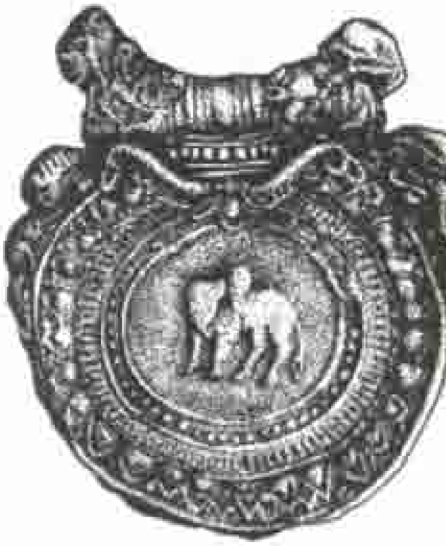

Fig. 14: Terracotta pendant of a bull from Operation 3 habitation area. Size 6 x 7 cm.

Monumental architecture at the site, such as pillars and the rampart itself, was clearly highly planned in their design and execution. However, ordinary habitation areas were very haphazard in their lay-out and idiosyncratic in their patterns of activity. The empty spaces between structures probably had some of the most varied uses, ranging from storage of construction materials to daily tasks related to keeping animals, food preparation, and washing. The juxtaposition of household and monumental architectural styles illustrates that socioeconomic interactions at Sisupalgarh were robust and dynamic throughout the Early Historic period.

Acknowledgements

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OCP Its Late Harappan Concept: Re-examined

M.D.N. SAHI*

It is being now realized that the Ochre Coloured Pottery (OCP) defined, as the one, which gives ochrous powder during handling, is not universally true. The once called Ochre Coloured Ware, may really have been black-on-red ware, the ochrous surface of some of the examples at Saipai and elsewhere being largely due to pulverization through external cause (Lal 1972: 47). In his Presidential concluding remarks, at the Seminar on OCP, A. Ghosh -remarked that 'this name is admittedly unsatisfactory, still unless some definite and satisfactory solution is found it is difficult to my mind to change the name' (Ghosh 1972: 28). Lal has also rightly pointed out that for the desertion of OCP settlements a ' Deluge' of massive scale was responsible Lal (1972: 101).During the last four decades or so the present author, by his personal observation of several OCP settlements, has come to the conclusion that on most of the sites there does exist silt deposition in thickness from 0.6 m to 1.5 m. The pottery usually found below the silt deposit varying or in kiln is finely slipped Red Ware bearing black paintings profusely, with varying degree of pulverization in small numbers. Now with its established association with 'Copper-Hoard' the OCP-Copper Hoard Culture does occupy a definite stage, as one of the earliest Copper Age cultures in Indian archaeology.

OCP people were considered as Harappans themselves who migrated as 'degenerate refugees' to the Ganga Valley after their settlements at the main urban centers in the Indus-Saraswati valleys declined. (Sharma 1961, Ghosh 1964; Handa 1968). However, (Sharma1972; 24) modified his views and held that it is the integrated Bara-Harappan folk who moved into the Ganga-Yamuna doab and OCP was a separate but contemporary to them in the post Mature Harappan period. At Baragaon and Ambkheri the admixture of Late Harappan and OCP has been found (Dikshit 1979: 129). OCP has also been observed in a Late Harappan deposit at Bhagwanpura Period IA (Joshi 1970:98) though at many OCP sites like Saipai and Atranjikhera which are away from Harappan influence, Harappan traits are absent. There are many scholars like (Krishna Deva 1969) (Deshpande 1969), (Gupta 1963:1971-72:7), (Dikshit 1979; 1982), (Lal 1951, 1954-55; 1971-72: 48-49, 1997), (Gaur 1971-72), who believe that

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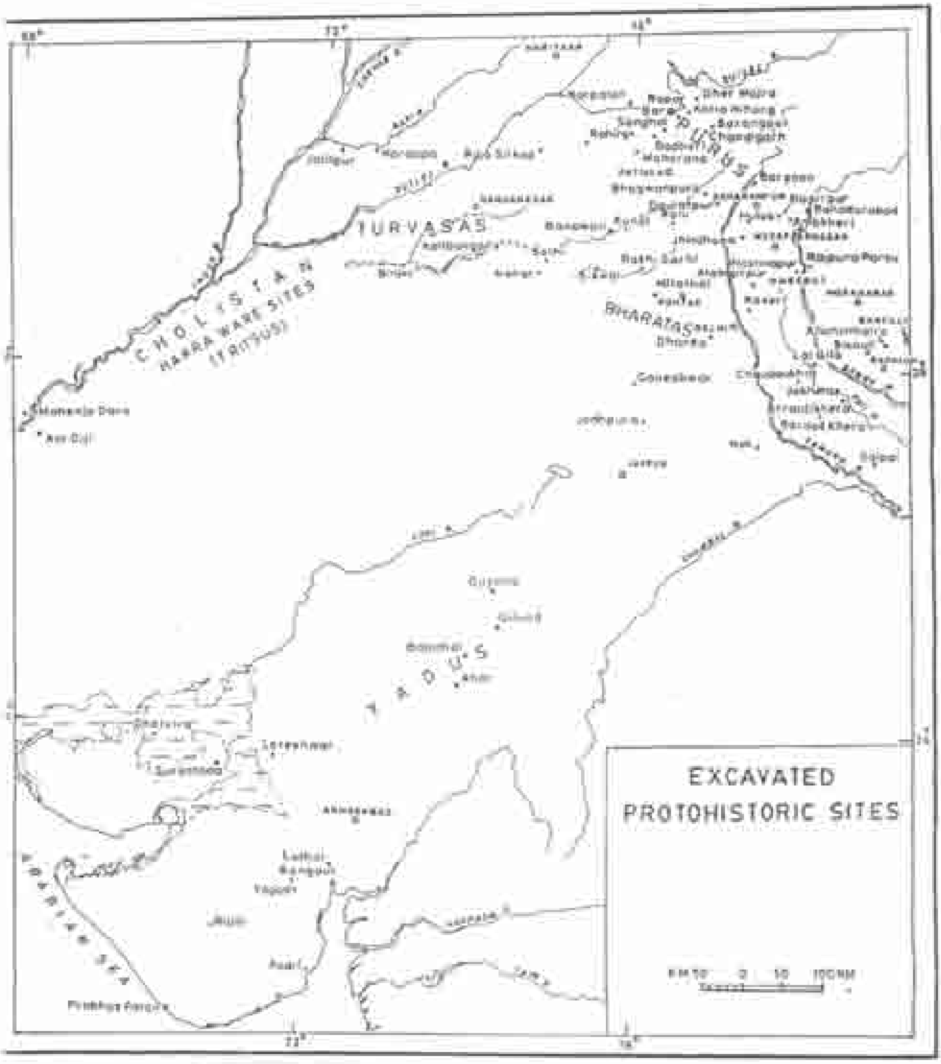

Fig. 1: Map showing protohistoric sites

OCP-Copper Hoard culture had a 'separate identity' from those of the Harappans.

Chronologically, therefore, OCP is placed to either Late Harappan or still later than the Late Harappans (Lal 1982; Dikshit 1979 ; 1982: 348). OCP of the Ganga valley is also distinguished from the Ganeshwar OCP culture complex as typical Copper-Hoard objects like swords, harpoons and anthropomorphic figures are not found in the Ganeshwar copper assemblage (Lal 1997:23). The Ganeshwar OCP culture has been placed to pre-Harappan cultural level beginning about c. 3000 B.C. (Agrawala 1984: 160). It is probably for this reason that Agrawala and Kumar (1982: 130) believe that OCP traits moved from Rajasthan to the western Uttar Pradesh.

Late Harappan phase according to Ghosh (1982: 321) is the de-urbanised phase of the Mature Harappan Civilization. Reacting to such a picture depicted by Ghosh for the Late Harappan society, Rao (1982: 354) observes: 'it need not imply total reversal of the cultural values and much less a sinking into illiteracy and complete backwardness'. In this context Rao's presentation of the late Harappan scenerio seems to be much more reasonable than that of Ghosh noted above.

The conception of 'decline' and 'degeration' has also been questioned by Shaffers (1982: 43). Cultural changes, according to him, distinguish the Late from the Mature Harappan phase, but the exact nature of these changes and the process responsible for them are at present unknown.

However, a clear examination and study of the OCP-Copper-Hoard culture has induced the present author (Sahi 2001: 77) to question the identification of this culture as Late Harappan, because it raises many problems that need proper explanation. To recapitulate these problems it may be stated that:

a) If we accept this identification and concept, it would mean that while cultures were flourishing between 7000 B.C. and 2000 B. C. in a continuous sequence to the west of the Yamuna and in the mid Ganga Valley, the upper Ganga Valley was a barren land without any settlement and habitation till 2000 B. C.

b) It also implies that radiocarbon dates and TL dates for sites like Hulas (3000 B. C. and 2400 B. C.), Jhinjhana (2650 B. C.), Atranjikhera (2280 B. C.), Lal Qila (2030 B. C.) are just unreliable and meaningless dates.

Gupta (1982: 53) has rightly pointed out that the limited number of Mature Harappan sites could not have disintegrated into so many settlements of Late Harappa even conceding the possibility of a higher population growth rate of this period. If this is so, from where did such a large number of people did come to occupy these Late Harappan settlements in such large numbers? As against about 570 Mature Harappan sites were about 985 Late Harappan sites (Gupta 2001: 186). In a systematic survey in Aligarh district alone there appear to be more than 125 OCP sites. In Saharanpur and Muzaffarnagar districts, the reported OCP/Late Harappan sites are 99 and 50 respectively. (Sahi 2001: 75). On the basis of the list provided by Joshi and Madhubala (1984) against the Mature Harappan sites, the number of Late Harappan sites are: Ambala against 1 Mature Harappan there are 21 Late Harappan sites. In Karnal against 1 there are 53; at Sonepat against 2 there are 21 and in Meerut against 2 there are 8 Late Harappan sites respectively. The above given figures clearly indicate that there was an inflow of population rather than outflow. This data contradicts the theory that there was a disintegration of the Mature Harappans to form the Late Harappan settlements.

There are many reported Late Harappan sites in Haryana and Punjab, which are mostly located close to the Mature Harappan settlements, for example Rakhigarhi is one such region. If so, the question may be raised that, if the ecological and climatic condition was not congenial for the survival of the Mature Harappans, how did it become congenial for the survival of the Late Harappans. And if it was congenial for sustenance of life in that region, why is it that the Mature Harappan settlement at Rakhigarhi was deserted?

On their displacement from the Mature Harappan settlements, if they themselves settled on the Late Harappan settlement, what did actually preclude the potters among the displaced Mature Harappan population, to continue producing or manufacturing typical classical Mature Harappan shapes like beakers, pointed bottom goblets, perforated jars, S-shaped vases etc. at their new Late Harappan settlements, and resorting to the same painting tradition of making motifs like fish, fish-scale, intersecting circles or chess-board patterns etc.? Did these pottery forms and painted designs become prohibited items for them after the break-up of the Mature Harappan fabric?

Late Harappan ceramic complex is generally considered to be an amalgam of cemetery-H, Bara Ware and OCP. To illustrate, it may be pointed out that Bhagwanpura I A has generally been accepted as an example of Late Harappan settlement. The excavator of Bhagwanpura, (Joshi 1978: 98) observes that the pottery of sub-period I A is comparable to Late Harappan ceramic types available at Bara, Bahadarabad, Atranjikhera, Siswal B, Mitathal II B, Daulatpur and Raja Karan-ka-Kila. Globets are availasble, but no beakers or perforated jars are available. Painted and incised pottery is available. The technique of incised red ware is reminiscent of Fabric D of Kalibangan pre-Harappan ceramic industry. Pottery with Harappan graffiti marks is yet another important find (Joshi 1978: 98).

Regarding cemetery-H ceramic complex, the observation of (Wheeler 1947: 65, 81) is very significant and relevant. He states that the site of western terrace is occupied by roughly built dwellings, constructed evidently at some distance of time, above a layer of debris (7 ft. in thickness) and associated with the ' intrusive ceramic' of cemetery-H which is represented by its pottery and has nothing to do with the Harappan culture. (Wheeler 1947: 21). This evidence thus suggests that cemetery-H people were not the immediate successors of the Mature Harappan people and they arrived on the scene as intruders after a considerable gap of time.

Y. D. Sharma (1964; 1965; 1971-72; 1979-80; 1982; 1987) has discussed Bara Ware with its characteristic i.e. chronological horizon, comparable shapes, painted designs and extent. The Bara Ware had a very long survival span in point of time. Early levels of Bara Ware are represented at Sanghol, Dher Majra and Mahorana (early deposit) as its exclusive sites. This level is coeval with the pre-Harappans as reported from Banawali II A, and Rohira. In a late Harappan context it is found at Mitathal II B, Banawali III and Kunal II. In the last phase it is represented at Bhagwanpura, Dadheri and Katpalon. In this phase it coexists with the Painted Grey Ware. These observations are more or less also supported by(Lal1997; 268) who says that the picture in the Sutlaj valley is that in a milieu of local pottery tradition, termed Baran that the Mature Harappans made its appearance. However, in due course of time, the Harappans became feeble but the thrust of the Baran continued . These evidences make it perfectly clear that in a post "Harappan phase the Barans continued to survive, and not the Mature Harappans.

It has been stated by (Bisht 1982:120) that Period III at Banawali is stratigraphically posterior to the Harappa culture, as post Harappan material is found in pits and kilns dug into the Harappan cultural debris on the top of the mound and hearths by cutting the fortification walls of the Mature Harappans. Therefore, he prefers to call this deposit as 'post-Indus', although it has widely been designated as Late Harappan by the majority of authors. One would have liked to call it 'Bara' alone, had it not been overshadowed by the controversy with regards to its chronological position and cultural status.

It is further reported that bricks were not in use as building material and structures were made of packed mud. It is also significant to be noted that Bara Ware occurs sporadically in the preceding period. But the personality of Bara ware is punctuated and marked by astounding resurgence of most of the painted motifs and pottery forms of pre-Indus tradition and is marked by exuberance of paintings. Among other characteristics is the wide use of incised patterns. There is also a grey, blackish as well as red ware of crude texture tampered with sand or chaff or both. It is also associated with cemetery-H types.

Thus, the evidence from Period III of Banawali corroborates Lal's division of Late Harappan Period into two phases (Lal1982: 337) supported by (Dikshit 1982) At Harappa there was an intrusion of the cemetery-H people after a time gap. However, the most significant

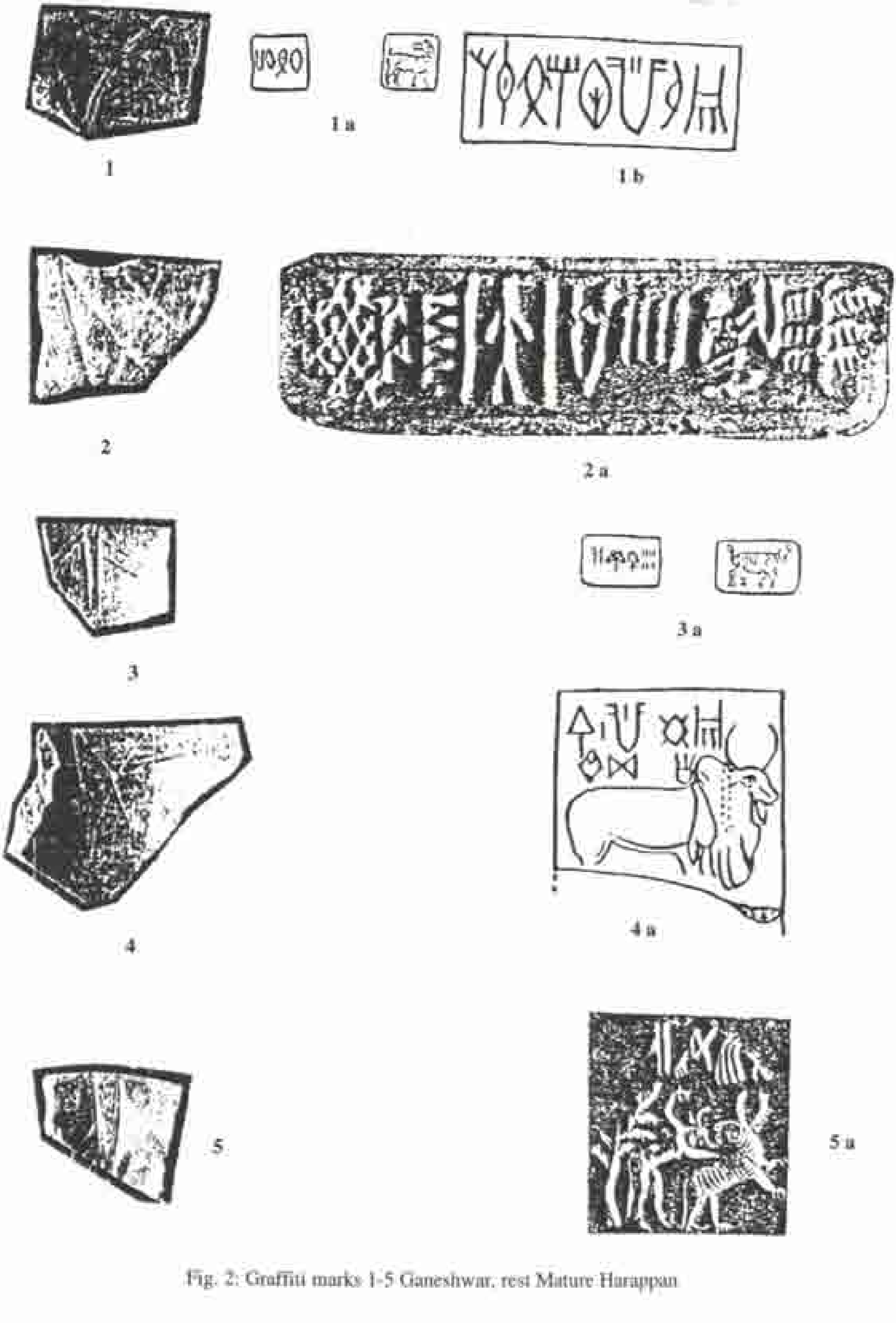

Fig. 2: Graffiti marks 1-5 Ganeshwar, rest Mature Harappan

fact to be noted here is that the Barans arrive again at Banawali, after the Mature Harappan people had completely deserted their settlement and therefore, after some gap of time. The occurrence of cemetery-H pottery, that too after a gap, also corroborates this inference. The absence of Mature Harappan pottery and associated material objects is also indicative of the fact that after the desersion of the Mature Harappan settlements, there was some time gap after which the settlements at Harappa and Banawali were reoccupied. But the occupants of these settlements were not the Mature Harappans themselves but the Barans, as the resurgent culture at Banawali is Bara culture alone. At Harappa also there was an intrusion of the Cemetery-H people after a time gap. In such a situation Bisht (1982:120) is quite justified in naming this Period III as ' Post Indus Banawali-Bara Culture' and not " Late Harappan'.

The stratigraphical and chronological position of the OCP in northern India is still not clear. It has been argued by (Lal 1982) that Alamgirpur and Hulas do indicate infiltration of the Harappan culture into the Gangetic valley, but not of the urban phase. It was only towards the end of its life, in any case, after the eclipse of its urbanism, that the Harappan Culture entered the Ganga-Yamuna portals. Bhagwanpura survived at a time when the Harappan had completely lost its urban character and had been diluted, with the amalgam of other 'cousin' cultures (including OCP) to a stage beyond recognition (Lal 1982: 337). Thus Lal visualizes two phases of the Late Harappans one represented by Alamgirpur and the other by Bhagwanpura. According to him this accounts for the coexistence of Late Harappan Bhagwanpur along with ' cousin' cultures like cemetery-H and OCP. But the question that crops up in this context is that can we equate cemetery-H, the intruding culture with the OCP culture, also presuming its sudden introduction or intrusion. Can OCP culture be conceived without any antecedental phase? If no, when, where and how the OCP people got an opportunity to acquire such an advance copper technology and an enormous quantity and variety of Copper objects in hundreds found in several Hoards? The fact that copper assemblage of the OCP culture was infact much more voluminous and richer than the Mature Harappans themselves, which presupposes its long antecedental phases.

OCP- Copper-Hoard culture has been considered as the richest culture in copper assemblage, of all the chalcolithic cultures that existed in India. Types of objects includes objects of offence and defence, professional and agricultural tools like chisels, celts, hoe, bar-celts (plough-share), khurpi, ornaments like rings, bangles and beads, religious cult objects like variety of anthropomorphic figures. Crucible found at several sites including Atranjikhera, Lal Qila etc. indicate local melting of copper for manufacturing objects on the sites themselves. Thirdly, these objects were widely distributed all over India, which presupposes an already established exchange network. Fourthly the material prosperity of the OCP people is not only reflected through their copper objects, but cache of exotic gold and silver objects found at Mandi (Sharma *et.al* 2001) and Sanauli (Sharma *et al* 2006: 166-179).

Besides, the material prosperity of the OCP people, they were advanced farmers also. Crops cultivated by OCP people at Sringverpur (Saraswat 1980-81: 80-83) included rice, barley, sisame, and cotton, besides fruits like ber, mango and *mahua*. Crops attested at Atranjikhera (Gaur1984) are barley, rice, gram and khesari, whereas crops attested at Lal Qila (Gaur 1995) were two varieties of wheat, barley and rice. The present author intends to submit that the material and agricultural prosperity do not commensurate with the cemetery-H or Late Harappan cultures. The material prosperity of the OCP people also do not seem to make any impact on the other cultures which are supposed to have been coeval with the OCP culture. This makes the coexistence of these cultures doubtful.

Moreover, if OCP culture can be placed in the chrono-cultural phase, when Harappa Culture had completely lost its urban character and had been diluted to an unrecognizable state, how is it that graffiti marks resembling the signs of the Harappan script appear on the pottery of Atranjikhera and Lal Qila and Ganeshwar? (Figs. 2 and 3)

It is difficult to accept that all the material prosperity of the OCP culture and their achievements are the handiwork of 'degenerate', decadent' and deurbanised Harappan people. Therefore OCP-Copper Hoard culture may not be accepted as a 'cousin' culture of the non-existent 'Late Harappan' culture.

OCP and Ganeshwar Culture

This brings us to examine other related aspects of the OCP culture. One such aspect has been its distinction as a separate cultural entity from that of the Ganeshwar OCP culture (Lal 1997: 23). In this context it may be stated that the present author (Sahi 2005) has demonstrated on various grounds that the Ganeshwar OCP and the Copper Hoard OCP are one and the same and not two distinct entities. The grounds are:

1. Copper flat celts and shouldered celts similar to those found at Ganeshwar, with indention marks have been found at Bahadarabad, Pariar, Bithoor (Agrawal 1987) and Haswa (Kumar 1997) in Fatehpur district.

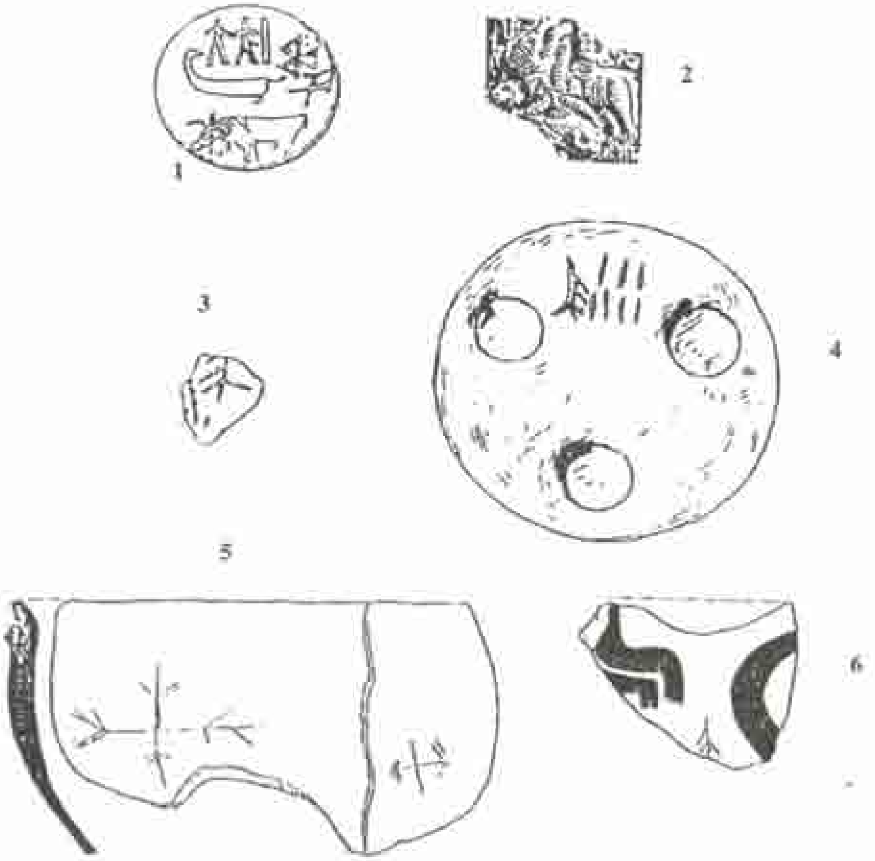

Fig. 3: Graffiti mark 1. Bahrain, 2 Mature Harappa, 3. Atranjikhora, 4. Alamgirpur, 5-6. Lal Qila

2. Harpoons, swords, chisels and celts of the Gangetic type have been found at Malah (Bharatpur district) in Rajasthan. Celts of the same variety have been reported from Nandlalpur (Jaipur district), Kota, Maholi (Distt. Swai Madhopur) and Chitwari (Jaipur district). The Chitwari site has also yielded a harpoon (Hooja and Kumar 1995: 325).

3. The copper contents of Bisauli anthromorphic figure is 98.77 percent, whereas celts from Ganeshwar has 97.0% and all the seven copper objects recovered from Mitathal II A and II B levels have copper content ranging between 98.13 to 98.64%.

Hence, all these objects mentioned above from Ganeshwar, Mitathal and Bisauli seem to have been produced at one center, probably Ganeshwar since other centers are not producing centers of Copper objects.

The OCP cultural deposits at sites like Sringverpur (Lal and Dikshit 1979-80), Pariar, Atranjikhera (Gaur 1983), Jakhera (Sahi 1994), Noh and Jodhpura (Kumar 1997) were found overlaying the natural soil and were capped by deposits which were characterized by the occurrence of unpainted Black-and-Red Ware. The ceramic assemblage of Ganeshwar (IAR 1987-88, 1988-89) has been reported to be identical with that of Jodhpura (Agrawala and Kumar 1982: 129) on the one hand and with those from Atranjikhera (Gaur1983) and Lal Qila (Gaur1995) on the other. This evidence also points out towards the same chrono-cultural horizon for both these cultural entities. These are sufficient grounds to link Ganeshwar- OCP with Copper-Hoard-OCP cultures.

OCP and Hakra Ware

Another aspect of the OCP-Copper-Hoard culture worth consideration is its relationship with Hakra Ware culture, which is identifiable with one another (Sahi 2005, 2005, 2006). Hakra ware has been reported from Cholistan region (Mughal 1982) and Jalilpur excavations (Mughal 1972) in Period I, along with OCP.

Jalilpur Period I yielded pottery, which is mostly hand-made and includes thick tampered pieces of globular vessels with exterior surface, coated with a mixture of clay and pottery bits. The pottery with similar treatment on the exterior surface is also reported from Amri Period I A and later and dated on radiocarbon to the middle of the fourth millennium B. C. A few pieces of pottery with similar technique of surface treatment has also been found from the fourth millennium B. C. level of Period I at Sarai Khola (Kala). The other pottery from Jalilpur consists of small percentage of carinated cups and dishes and abundance of potsherds of unrecognizable shapes because of their rounded edges as if rolled by water action. These are mostly of pale-red colour and soft in texture as if underfired. The body is so soft that it can be peeled or rubbed off easily, recalling the so called OCP(Ochre Coloured Pottery) (Mughal 1972: 119).

It is also significant to note here that Mughal further observes that on stratigraphical evidence alone the pottery that looks like OCP is earlier than (the Early Harappan) Period II at Jalilpur and therefore, should be placed in the fourth millennium B. C. (Mughal 1972: 119 fn.9).

The evidence from Jalilpur gets further credence due to the fact that Durrani and Farid Khan of Peshawar University., Pakistan, after examining the pottery from Atranjikhera and Lal Qila at Aligarh in 1989, were also of the view (in personal communication) that similar pottery is found in ' cart-loads' at several sites in north-west Pakistan, which belongs to pre-Early Harappan levels. On the basis of comparative study of Hakra Ware and the OCP, an inference can be drawn (Sahi 2005: 237) that the two wares are also identical. The grounds for this inference are:

Both do not have a painting tradition in white, which is the characteristic feature of the Kot Dijian i.e. Early Harappan phase. In both the ceramic complexes both hand-made and wheel made pottery is found together. Vessels coated with mud are common to both the wares. Pottery bearing externally incised designs like oblique, horizontal and curvilinear and comb designs are common to both the wares. There are wheel made pots of fine fabric and red/ chocolate slip, bearing broad black bands paintings along the shoulders or neck are common to both the wares. Black slipped Red Ware is common feature to both these wares. In both cases, pottery occurs in a pre flood deposit and lose their slip generally due to water logging.In the post-Flood deposits both the wares continue to survive. Independent Hakra ware level has been identified recently at Baror (Sant *et al* 2005: 50-59) in Sri Ganganagar district of Rajasthasn and Bhirrana (Rao *et al* 2004; 2006: 61 and 2006: 45-49) in Haryana, which may be taken as a manifestation of the OCP culture.

On the basis of similarities in ceramic complexes of Hakra ware, Ganeshwar-OCP and Copper-Hoard-OCP an inference can be drawn that all these cultures in fact are one and the same culture. They have been given different names in separate ecological and geographical nitches of the sub-continent. Besides the problems and questions raised above under Point Nos. 1-9, the evidences from Jalilpur, Ganeshwar, Jodhpura, Atranjikhera and Lal Qila, provide additional grounds to reject the concept of ' Late Harappan' assigned to OCP culture as a Myth.

Occurrence of graffiti marks on the pottery of Ganeshwar, Atranjikhera and Lal Qila (Fig 2-3) and on the copper objects of the Copper-Hoard assemblage (Kumar 2002-2003) resembling the signs of the Harappan script impels us to infer that the Hakra-OCP culture represents the earliest stage of the Harappan Civilization, when except the copper technology, which was already known and the introduction of the script, its other classical forms had yet to be evolved. The Mature Harappan forms ere gradually evolved in later stages of cultural development through Early Harappan to Mature stage (Sahi 2006).

Chronologically, this culture can be dated between 3700 B. C. and 3000 B. C. Because the pottery of the Advanced Mesolithic phase at Bagor (Misra 1973), Ganeshwar (IAR 1987-88) and Jodhpura Ia and Ib (Kumar 1977) are conspicuously devoid of any kind of painting. The earliest date for the introduction of painting tradition on chalcolithic pottery comes from Loteshwar, Padri (Sonawane 1994) and Balathal (Misra and Mohanty 2001), is about 3700 B. C. Thus, introduction of painting on pottery becomes the hall-mark for distinguishing the pottery of chalcolithic levels.

Hakra-OCP culture has been classified into two phases. The earlier one represented at Jodhpura IC, Atranjikhera I and Saipai, when its pottery is characterized by only linear paintings consisting of thick bands, thin parallel lines, criss-cross or curvilinear or loops. In the second phase, some of the pottery forms of Hakra Ware like drooping rims of dish-on-stand is introduced. The paintings also become more rich and varied including elaborate geometrical forms, floral and faunal motifs like humped bull and peacock. Lal Qila is the type site (Gaur 1995).

The culture comes to an end due to a massive Deluge (Lal 1971-72: 101) of great magnitude, which has now been recognized as a World wide phenomenon. The present author has associated this Deluge with the Great Flood mentioned in the *Satapatha Brahmana*, which took place during the time of Manu Vaivasvata (Sahi, 2005, 2006). According to(Pusalkar 1988: 274) this Great Flood was a World-wide phenomenon, and did occur in 3100 B. C. Thus, ends the pre-Eary Harappan (Hakra-OCP) Phase of the Mature Harappan Civilization datable between 3700-3000 B. C.

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The Early Farming Communities of theNorthern India: A Fresh Approach

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The Early Farming Communities of northern India is best represented in the Kashmir valley which denotes a local phenomenon with assimilation of new technologies from various advanced contemporary cultures. Hence, the conventional thought of dissemination of these cultures from the neighbouring areas needs a fresh estimation.

Geological Background

The Kashmir Valley witnessed a series of glacial and interglacial periods. Those climatic fluctuations tremendously influenced the pattern of growth for the primitive cultures living there. The intervening interglacial periods were favourable for man, while the glacial periods were totally ice-covered and adversely affected life. Palaeo-Climatic Research has shown that around 10,000 B.P cooler conditions prevailed in the valley which witnessed excessive precipitations followed by tremendous land erosion. This forced the people to migrate from the Kashmir Valley to the Sub-Himalayan region and Central Asia. Extinction of animals like horses and elephants took place due to the extreme cold. Their fossil remains are found in the Karewa beds. On the archaeological side, the poor climate is substantiated by the absence of Mesolithic industry in the valley. However, by 5,000 B.P. the climatic conditions became warmer and more people migrated to Kashmir from the neighbouring regions with sophisticated and affective hunting techniques.

The Backdrop

To cope up with this varied climate and glacial sequence, early Kashmiris started to manufacture a large variety of tools and weapons for hunting and later on for farming. These tools have been described as Palaeolithic, Microlithic and Neolithic have been associated with the Old Stone Age, Middle Stone Age and New Stone Age Cultures by the scholars. The first palaeolithic tool was discovered on the right bank of Liddar river, Pahalgam, in the form of a huge massive flake. In 1935 De Terra and Paterson carried out a detail geological survey of the region under the banner of the Yale Cambridge Expedition. The team studied glacial sequences as well as climatic fluctuations during the later part of the Pleistocene. They also studied the nature of prehistoric culture in this region and categorized the Lower Palaeolithic industry as Pre Soan, Early Soan, and Late Soan on the basis of technological features. These artifacts came from the different terraces of the Soan river, a tributary of the Indus, in the Potwar area.Largely,the early human activities in this region were found in three localities i.e. Chitta, south west of Rawalpindi in the Potwar plateau, Pampur a few miles east of Srinagar and the third is the Kargil, just beyond the main Himalayan Range on the ancient route of Zojila Pass, connecting India with Central Asia. After De Terra and Paterson, the valley was extensively studied by many other scholars and Soan type tools were found in different parts of Kashmir which extends up to the river terraces of the Beas and Banganga valley of the Punjab and Himachal Pradesh.

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With the passage of time Middle Paleolithic people came. The tools manufactured by them were found from Pampur on the lower reaches of Jhelum in the brown clay overlying the lake bed about 4 mt above the stream corresponds to the lowest terrace level of Jhelum and its tributaries. More discovery in this regard were made at Sombur, 19 km from Srinagar where, a number of stone tools such as burin, points, borers, utilized flakes, demonstrating the use of prepared core technique were noticed. Based on jasper, siliceous limestone and trap rocks, such tool types indicate that human settlements thrived in the valley during the Middle and the Upper Palaeolithic periods.

The most interesting evidence of the Prehistoric Cultures in the Kashmir Valley has been encountered at Kulladur, Bhatchak, Tapriballa, Huin in Baramulla district, Khan Sahib, Hab Shah Sahib in Badgam district. There, tool types like backed knives, elongated parallel sided scrapers, flakes, cores etc were found on the surface. This lithic industry is also marked by huge chopper, discoidal cores, borers, flakes, knives, scraper along with typical grinders, and pounders associated with the Neolithic. Surprisingly there is a total absence of polished tools. A detailed examination shows that there is a succession of Stone Age industries which goes back to Palaeolithic times. All these evidences strongly indicate a long drawn process of the transformation from the food gathering to food producing economies. Evidence of such food producing communities in north India was first recognized in the Kashmir Valley.

Being situated in a unique geographical unit and an unparallel environment of the Himalayas, the Early Farming Settlers were isolated and maintained a distinctive character of their own which is nicely represented by nearly three dozen sites. They all are located on the elevated flats of the Karewa beds covered with loessic silt and often overlook streams and lakes. Of these explored sites, only Burzahom and Gufkral, have been scientifically excavated where the culture is marked by two distinct divisions designated as Northern Neolithic A ceramic Culture and Northern Neolithic Ceramic Culture. Later a series of similar settlements were identified under the Kashmir Palaeo-Climate Research Project, initiated in 1980.

Some Excavated Sites

Burzahom or the place of birch, was identified by De Terra and T.T Paterson in the year 1939, who conducted a limited excavation that revealed a rough idea about the site. As the ground was crested by high profiles of menhirs,it was primarily considered by them as a megalithic site. But the scientific excavation at Burzahom carried out by T.N. Khazanchi of the Archaeological Survey of India(1960-71) revealed three fold sequence of cultures beginning with the Neolithic followed by the Megalithic and Historical. The Neolithic culture shows three phases of evolution labeled as IA, IB and IC. The first phase designated as the A ceramic is represented by both circular or oval dwelling pits. The pit chambers, square to rectangular in shape were cut into the loessic silt and their floors were often painted in red ochre. The occurrence of charred reeds, birch and post holes in one of the pits suggest some kind of roofing arrangement (IAR 1960-61). The deposits yielded well polished artifacts of bone, stone and antler. No burial either human or animal have been reported from this period.

In the succeeding phase IB, ceramic neolithic level, pottery began to be used. The inhabitants continued to live in subterranean pits and squarish chambers, some of which had alcoves in the side walls. These dipper pits had landing steps leading down to the floor which were sometimes interconnected. The pit chambers were located at the centre of the mound where as the dwelling pits were on the periphery. Some of the pit chambers had depressions on all the four sides and storage bins and hearths in the centre. Thick floors composed of compact clay mixed with lime or chunam, post holes, circular hearths were also recorded. Among the cultural equipment, items from the previous period continued and addition of other hunting tools noticed. The percentage of domesticated animal bones, including cattle and dog in addition to sheep and goat, shows a progressive increase; where as the wild animal reflects a subsequent decrease. All these evidences demonstrate that the Neolithic people were primarily depended on hunting, fishing and cereal farming (as evidenced from the cultivation of wheat, barley, lentils, etc.).

With the introduction of food production, a need arose for storage which indirectly led the ancient Kashmiris to invent various kinds of hand made earthen wares. Among the principal wares, mention may be made of thick coarse grey ware, fine grey ware, gritty dull red ware, which show shapes like globular jars, bowls, and basins, having disc bases often bear mat impressions.

The last phase of this neolithic culture, christened as IC marks a distinct change from the previous two stages. People preferred to stay above ground, either in mud bricks or adobe dwellings perhaps in keeping with variations in climate. Most of the pits and pit chambers were filled and covered with mud plaster floors and a thin coat of red ochre, later used as a floor. One of the largest floor carried a series of forty five post holes below the surface probably indicates it a community structure. Domestication of animal increased, tools began to be made in large numbers with a better finish. New types of sophisticated tools (small sized bone points, needles, double edged picks, double edged points), and spindle whorls, harvesters (both rectangular and semi circular) etc were introduced. Other cultural materials such as pendant or bead of light green jade, terracotta bangles, cowries, shells etc suggest that the people of this period started to lead a settled life.

During this phase, burnished grey ware was observed in addition to the existing ones. But, the most important find from the lower level of this period is a wheel made vase of orange slipped ware with a horned figure painted in a black paneled between the neck and shoulder bands. The shape and design of the pot resembles Pre Harappan Kot Diji (Indus plain) type. Even the upper level also exposed a wheel made red ware pot bearing 950 carnelian and agate beads beside copper arrowheads, celt, bangles, spearheads, knife-blade and rings. All these objects are considered as an intrusive.

Other notable finds of Period IC are two engraved stone slabs found fixed in a rectangular structure facing downwards. One depicts a hunting scene while the other shows an incomplete pattern generally identified as a tectiform. Six human burials (both primary and secondary) throw light on the funerary practices and beliefs of this period. The study of dental wear patterns of the skeletons revealed that the neolithic people of Burzahom had a very coarse and rough diet, which is consistent with their subsistence economy. In one case, an animal burial with fragmentary bones of wild dogs and two antlers of *barasingha* was exposed.

Period II ushered an era of megalithic people at Burzahom. They erected menhirs in honour of their dead ones. This period is followed by historical occupation on the site.

Gufkral or the potter's cave, excavated by K.D. Banerjee and A.K. Sharma of the Archaeological Survey of India (1982-83) is a very well developed Neolithic settlement. Situated about 41 kms south-east of Srinagar and capped by 16 megalithic stones, it confirmed the same sequence of Burzahom, but added new dimensions to northern neolithic culture in this region. Here the period IA is marked by shallow, deep, oval or circular and rectangular dwelling pits, narrow at the top and wider at the base. Open air dwellings were also evident. These pits were further surrounded by storage pits, hearths and a number of post holes that probably supported a super structure of grass and reed (A.K.Sharma 1998) The subsistence economy of the people was marked by food gathering, cereal farming (wheat, barley, lentils, clovers)etc and stock raising (wild and domesticated animals i.e. ibex, stag, bear, sheep, goat, cattle).

Period IB revealed both a mud platform and a rubble wall. A central post hole and a number of smaller post holes on the periphery of the platform indicating it supported a conical roof. Another important aspect of this phase is the total disappearance of dwelling pits in Period IB. The period is marked by extensive burning activities as testified by a large quantity of charcoal and charred wood pieces. Other significant findings include two semiprecious stone beads. Interestingly, the number of domesticated animals totally out numbered those of Burzahom. A large number of grey ware is found in comparison to Burzahom besides one piece of a dish on stand of coarse dull red ware. Unlike Burzahom, at Gufkral a potter's kiln with a diameter of 1.7 meter was revealed.

Period IC witnessed a subsistence economy that had undergone radical changes. It saw the appearance of a series of post holes around the dwelling pits and storage pits suggesting the practice of dwelling pits had evolved again in this phase. In addition, the period has yielded double holed harvesters in stone and bone, an engraver and spindle whorls in stone and terracotta. Other important findings are a copper pin with a flattened coiled head, a variety of polished bone tools and carnelian beads. The pottery consists of grey ware, burnished grey ware, burnished black ware and gritty red ware. Made of coil and strip technique it was fired to variegated shades of grey and black and shows a burnished surface. Their decoration include mat and chord impressed bases, reed and straw impressions on the body, pinch and incised oblique designs on the neck portion. A few sherds with graffiti marks also deserve mention. All the shapes of period IB were found to have continued.

Like Burzahom, here period II is designated as the Megalithic and period III represents the historical one.

Regarding other excavated site, **Malpur**, or locally known as Bathera (which means a place of stone implements) was situated on the foot hills of Pir Panjal range at a distance of 28 km north of Jammu on the left bank of Ranbir canal, drawn from the river Chenab is a lesser known neolithic settlement of this region. Here, trial excavation was conducted by the first author on behalf of the Archaeological Survey of India (1995-96) that revealed artifacts (Pl.1 to 4) like chisel, celt, ring stone, quern, pounders, and a few number of unfinished artifacts like flakes, cores, debitage etc.Although the tools are not polished, but typologically they resemble with the artifacts of Burzahom and Gufkral limited number of ill fired red ware showing medium to thick fabric was also encountered, the shapes including bowl, vase and long necked jar deserve mention. Coarse grey ware also came across representing flat base of the pots. The shapes resemble with the handmade ware found from Gufkral and Burzahom.On the basis of a mud floor and a line of boulders around the oval shaped floor it has been suggested that inhabitants lived on mud floors prepared on the ground supported by thatched roofs. The characteristic feature of the Malpur Neolithic is the complete absence of bone tool industry.

Some other sites

Beside this, trial diggings were also taken at Kulladur near Pattan on Srinagar-Leh Highway and Shepandur on Pampur-Sombur link road during palaeo-climatic research. The small scale digging at Kulladur provided mainly grey and burnished wares although gritty red ware was conspicuously absent. The lowest deposit, sealing the natural soil is marked by compact black coloured soil, devoid of pottery. It is followed by ceramic levels of 2 mt. thickness. These are marked by loose muddy, charcoal layers with intervening thin floor levels Stone implements are few and lack polish. The burnished ware is mostly represented by dish-on–stand with circular or horizontal designs on the neck parts and triangular perforated decorations on the stem. Grey ware is marked by globular pots. No bone tools were found either on the surface or in the trenches. In the case of Shepandur, a series of floors levels with intermittent burnt layers were noticed in the mid-levels. The layer, sealing these deposits yielded a gritty red ware pot with an out flayed rim. This stratum corresponds to the closing phases of Neolithic levels evidenced both at Burzahom and Gufkral.

Further, in course of the survey from Anantanag to Pampur in the Jhelum valley, a number of sites like Begagund, Gufkral, Hariparigom, Jayadeviuder, Olchibag, Pampur, Panzgom, Sombur, Thajiwar etc were explored. Other notable sites of the valley are Gurhom Sangri near Wular Lake and Damodara Karewa to the south west of Srinagar. The sites at Aripanthan near Magam, at Puthkah near Sangrama Devi-ekampura on way to Gulmarg are also noteworthy. Gandarval in the Sind valley and Baimlum on the Wangat Nullah in the Kashmir valley were also explored earlier by Paterson.

Chronology

As far as the chronology of the Neolithic Culture of Burzahom is concerned, C 14 dates suggest a time bracket of C A. 2400 – 1500 B.C (uncalibrated) for period IB and IC. IA is relatively dated as a century earlier. Moreover, botanical remains collected from different Neolithic strata are assignable to 2325 – 1500 B.C. Gufkral on the other, shows a C14 date for the A ceramic Neolithic level as 2470 +110 B.C. and the ceramic level of 2100 B.C. Even typologically, the date of Malpur has been assigned by the excavator between 3000-2500 B.C. Using the MASCA calibrations, the date of Kashmir Neolithic has been assigned for the Period IA 3000-2850 B.C . IB 2850-2550 B.C and IC 2550-1720 B.C . Hence, on the whole it may be assumed that the Neolithic culture of the Kashmir valley was in existence during the third millennium B.C.

Some Natural Advantages

A closer observation of the chronology and the material perspective of the early farming sites have revealed that when the Kashmir Valley was passing through the Neolithic stage, the valley of Indus or parallel river systems were witnessing full-blown urbanization, best represented by the well developed Indus or Harappan Civilization. Laying on the cross-roads of many nations like Pakistan, Afghanistan, Baluchistan, Tibet, Central Asia, and China, the valley has experienced continuous movements of multiple-ethnic groups. Naturally, this region had a wide cultural contact from the Neolithic period onwards with the sites like Sarai Khola in Potwar plateau,Ghalighai, Aligrama and Loebanr in Swat valley, Kile Ghul Mohammed in Quetta valley, Baluchistan and Jalilpur in Pakistan. Being situated in the same geographical tract and time brackets these sites influenced the Neolithic cultures of Kashmir as certain traits are found to have been adopted by the people of this valley.

It is presumed that the plausible route (Fig. 1) of their contacts may be through the passes of south western Baluchistan from Mehrgarh (Bloan pass) by way of Kot Diji, Jalilpur, Saraikhola to the Kashmir valley in the north east. Another probable route was from the north-west connecting Aligrama ,Loebanr, Ghalighai all the way through Saraikhola upto the valley. Significantly on both the routes, Saraikhola is the only common site, which is nearer to the valley, through which the Harappans perhaps hold their sway over this region.

Probably due to this contact one can find the appearance of the Kot Dijian pottery and a red ware pot with 950 semiprecious stone beads from period IC of Burzahom. Further proof of this contact lies with a copper pin from Gufkral IC which has parallels with the contemporary Harappan Cultures of the Indus Plain and the Mature Harappan Culture of Manda in Kashmir. In addition to this, the discovery of copper celt, axes, spearhead, bangles, and rings shows a restricted number

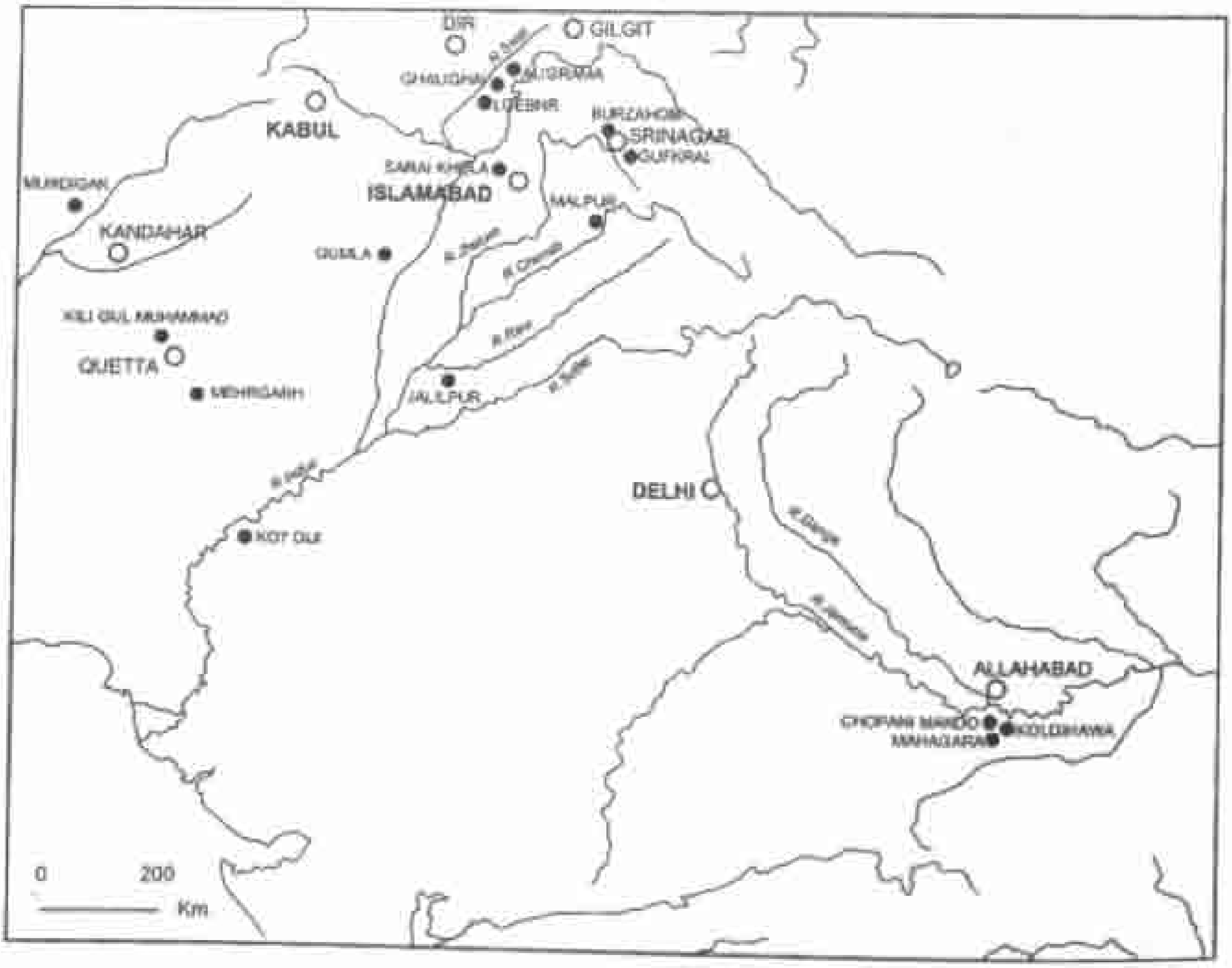

Fig. 1: Map showing the site of Food-Producing communities of Northern Neolithic Culture

of items might have been imported from the out side region. Thus, period IC of both the sites comes under an integration era.

Few common traits

As far as the common traits are concerned it is believed that the main similarities between these two regions are the hand made pottery with basket or mat impressions on their bases and scratching with reed and rushes on the exterior surface. This technique of scratching the external surface with a straw brush is reminiscent of the Neolithic pottery of Yangshao horizon of northern China. Further, resemblances have been tried to show in other materials like structural activities including the underground dwelling pits, bone objects and the use of black- grey burnished wares having basket or mat impression etc with the Neolithic level of Sarai-Khola in Potwar area, Ghalighai, Loebanr III and Aligrama in Swat valley of Pakistan.

Pit Dwelling- An outside influence

The long survival of pit dwelling in and around the Kashmir valley is generally considered as a natural phenomenon of the Early Farming Communities, as they had to adopt such kind of dwelling practices in order to cope up with the existing climatic condition. That is why, as climate ameliorates, the same people are found to have started living on the open air. It may be pointed out that before the advent of these people, pit dwelling was very much in vogue in the Early Harappan level of Kunal, District Hissar, Haryana in the early part of the third millennium B.C. Even, this tradition continued for more than thousand years are manifested in the neolithic phases of Chirand in Bihar and Nagarjunakonda in Andhra Pradesh. Such long duration of any tradition is only possible when it has an indigenous origin of its own. Hence, the practice of pit dwelling is an outcome of the out side influence, probably requires further amplification.

Similarity in Bone tools

On the basis of the bone objects (particularly points and awls) of Loebanr, efforts have been made to draw their influence on the Early Farming Communities of Kashmir. As, various fast moving animals like deer, wolf, dog which provided favourable material for food to the Neolithic people of this region, were also helpful in preparing bone tools and weaving of woolen garments. Thus, the availability of a good number of bone tools of various sizes bears testimony to the fact that these people developed such sophisticated bone tools out of their own requirement as there is no scarcity of wild animals. That hunting was one of the favourite occupations of those people is evidenced by a hunting scene engraved on a stone slab found from Burzahom (Pl. 5 and 6) Hence, this similarity in bone tools may be taken as a generic one

Ceramics

While examining the manufacturing of hand made coarse grey ware, fine grey ware and burnished wares of the valley it reflects the application of strip and coil techniques along with irregular marks of brushing of reeds and rushes on the exterior body and mat impression on the base of some pots It has been observed that probably this impression has been achieved due to the practice of thatching the roof of houses with reed and thin branches of willow trees at Gufkral (Sharma 1998) and pine and birch trees at Burzahom (analyzed from charcoal pieces recovered from postholes: B.K.Thaper). It is important to note that reeds and rushes are locally available in the swampy area of river banks in abundance. Thus, the techniques of potting indicate their local origin, although rudimentary similarities can also be observed with the fabrication of ceramics of Swat valley and the Potwar Plateau regions due to close proximity.

East Asian Influence

Scholars think that not only from the west, even influences also came from the east, especially the Yang Shao Culture and Lung Shan Culture of northern China. In respect of material equipments, both these Chinese Cultures present a different style to that of the Kashmir or Swat Neolithic Cultures, as revealed by the range and forms of ceramics, specially the tri pod with solid legs, the painted ware, terracotta human figurines, horse models and separately located cemeteries vis a-vis the habitation area. The availability of a jade pendant or bead and harvesters in the valley are ascribed to the result of the process of diffusion or borrowing of the Yang Shao culture of China This process of borrowing only two items is a matter to think about.

Furthermore, the penetration of East Asian Culture into the Kashmir valley through the intricate ancient routes that linked the Gilgit Valley with Xinjiang and the Tarim Basin (as the distance between these two regions is about 500 to 700 km depending on the pass taken) is inadequately understood. Moreover, significant Himalayan uplift took place during the Pleistocene Period when the lower Karewa Beds of Kashmir were uplifted up in the Pir Panjal Range by at least 2000mt. At the same time, tilting of Late Pleistocene lake terraces was also witnessed.Further,the greater part of northern India was experiencing arctic conditions separated by warmer periods. The result was a complicated and difficult topography to access. For this reason, interaction between the people of Kashmir and those of Xinjiang across the Western Himalayas and the Karakoram Range is a problem needs to deal with.

Migration of ideas

It is believed that China is a major centre for plant domestication in the world (due to the existence of fertile loess soil) and the idea of domestication of plants had come from China. But, it may be pointed out that like China, the loess soil of Kashmir is very much fertile, and one can not deny that this valley, the Potwar area and the Central Asia are also having the same loess-palaeosol sequences. Moreover, the Early Farming Communities were no less inferior in practicing agriculture is testified by the presence of hoes, harvesters, picks and ring stones which are indicative of their rudimentary knowledge of agriculture. This also further corroborates by the evidence of botanical remains of wild and cultivated crops like wheat, barley and lentils available in the surrounding areas. Therefore, any positive conclusion regarding the borrowing of idea needs appropriate elucidation.

Not only this, the study of deposition by the Scanning Electron Microscope (SEM) shows that before the advent of Neolithic people in the valley, wind borne silt or loess had covered up the area. Pollen diagrams constructed from the Haigam Lake deposits near Srinagar have revealed the evidence of a three stage disturbances of natural vegetation as shown by the decline and appearance of pine forest. The clearance of these forests at one stage is believed to be related to the framing experiments of the neolithic settlers in the valley. Hence, the domestication of plants can also be taken as an inherent quality or talent of the Neolithic people of Kashmir.

Some internal evidences of antecedent cultures

In terms of the origin of the Early Farming Economies in this region, mention may be made of some Neolithic sites of Belan Valley in the Vindhyan region (Chopani Mando, Mahagara, and Koldihawa) where a continuous sequence from the stage of food gathering selective hunting through incipient food producing to settled village farming datable to 7th to 5th millennium B.C have been identified. This sensational evidence has thrown a challenge to the conventional notion of diffusion of the early farming cultures from the West and East Asia.

Conclusion

In a nut shell, the Early Farming Communities showed their inherent talent in choosing their settlement on the fertile soil of the region, exploiting raw materials, manufacturing various tool types, both in stone and bone, constructing subterranean and over ground dwelling pits in response to the changing environment. The various techniques applied by them are reflected in every phases of occupation. The first two phases demonstrate an intrinsic quality of the dwellers, but in the upcoming phase when the Harappan started internal trade, a limited cultural assimilation took place. Though the contact could not change the basic subsistence economy and technology of the communities, but its impact is noticed in the further introduction of sophisticated techniques, exchanging ideas and thoughts in various spheres. Subsequently, elegant potteries, stone, bone and copper tools etc came into use. These artifacts illustrate the capacity and technical know how of the people in sustaining their economy in a balanced manner. Once the economy is balanced, art tradition developed, tectiform came into the picture. Traditional beliefs, burial practices became a custom of the society and in every sphere of life a modification is observed. Thus, the tradition which began with the A ceramic stage, eventually culminated into a fully developed Neolithic culture. It was perhaps due to this over all development, their settlements were increased, some of which have been explored and a few of them have been excavated and studied in detail. Further archaeological research to verify the authenticity of the archaeological finds and also to ascertain the antecedent stages of Neolithic Culture is still awaited.

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Discovery of Structural Stupa at Bhon District Buldana, Maharashtra

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VAISHALI KATHALE AND SATISH NAIK*

The recent excavation at Bhon situated on the right bank of river Purna in Buldana district of Maharashtra, has emerged as one of the largest early Historical settlements in the middle Purna basin. A structure, exclusively built of burnt bricks, with an intact brick platform all along circular in pattern at lower level, unearthed at the site has been identified as the stupa structure. The diameter of the stupa including *pradakshina patha* is 14 m. The bricks of various shapes used in construction of dome and *pradakshina patha* display an outstanding architectural skill of the builders. Chronologically the Stupa of Bhon can be assigned to c. 3rd century B.C. on the basis of C^{14} dates obtained on charcoal from the stupa and its striking resemblance with the stupa of Navdatoli and Kasravad in Madhya Pradesh in terms of the plan of the structure, brick size and pattern of incised symbols on the bricks.

Introduction

So far total 26 archaeological sites have been excavated in the Vidarbha region ranging in time from Chalcolithic to Vakataka period; of which 20 sites lies in Wainganga valley, 3 in Wardha valley, 2 in Painganga valley and one in Purna valley which belongs to Chalcolithic period. This underlines the fact that the western region known as Varhad comprising the Purna basin and Amaravati plateau remains neglected, which lies west of Wardha river forming a natural line of division of Vidarbha. The Purna basin lies in between Ajanta ranges in southwest and Gavilgarh hills of Satpura ranges in north. It is one of the deepest alluvial basins spread over an area of about 200 km^2. The river Purna emerges in Betul plateau and travels through Amaravati, Akola and Buldana districts of Maharashtra and merges in the Tapi river near Changdeo in Jalgaon District. This archaeologically rich but less attentive region has emerged with one of the largest and key early historical settlement at Bhon with recently discovered structural stupa. The structural stupas are usually made up of bricks and stones either on the plains or on top of a hillock in successive stages, whereas rock-cut stupas are chiseled out from a monolithic stone and usually found in caves. The significant point in early Stupa

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architecture was that they were all built on low base and had low hemispherical dome in which the ratio of diameter to the height is relatively less (Pant 1976).

So far structural stupa sites in Maharashtra is concerned, only six stupa sites comprising Pauni, Mansar, Ter, Sopara, Adam and Bhon are located in different parts of Maharashtra (Fig. 1). The recent discovery of structural stupa at Bhon has emerged as earliest one in Maharashtra state.

Structure of Stupa

In ancient India the Stupa usually was composed of the base, the dome (*anda*) which rest on the base and *harmika* fitted with shaft. Later on *vedika* was added. The space between the *vedika* and the *stupa* was left for circumambulation. In the early Asokan time stupas were mainly consisted of the above and during Asokan time the course of reorientation and enlargement of the existing stupas with more architectural additions were made. The story of *stupa* architecture and its development is to be traced from the pre-Buddhist period. Inscriptional evidences suggest that Piprahwa is the earliest stupa of mud existed probably during circa 400 B.C. (Mitra 1971).

The stupas in general, had in the beginning only one circumambulatory path and was based on low plinth and was without terrace. There was no flight of steps (Pant 1976). Usually Buddhist sees the Stupa as a representation of the Budhha and his enlightenment. Stupas are normally erected over the remains of Budhha, and usually contain a relic chamber in which a vessel – the reliquary is found that holds the bone relic. There are stupas which do not hold any sacred objects inside. These are commemorative stupas which are erected at places which are associated with Budhha's life or that of his renowned disciples (Bapat, 1997). In spite of diversity in shapes of stupas, the basic structural pattern remains same.

Drum (*Medhi*): a base of the stupa proper. Sometime forms a platform for *pradkshina* patha.

Dome (*Anda*): This gives shape to stupa. It's a greater part or heap up of mound hemispherical in shape

Umbrella (*Chatravali*): The shaft of Umbrella is known as *yasti* which rests on a base called *hermika*.

In the beginning the stupa did not posses anything but the dome built on a very low plinth. The second stage of evolution comes with the addition of *hermikas* followed by the addition of *vedika* which also suggest that the stupa at this stage became an object of cult as the *hermika* signified the honorific position of the structure.

According to Longhurst (1936) 'the earliest stupas were low circular brick mounds resembling outline their humble prototype of the pre-Buddhist period. Earliest known Buddhist stupa has been found at Piprahwa belonging to circa 400 BC. It seems that at a later date the stupa was encased with bricks and then delineation of structural components of the stupa was clearly made. Originally it was only in the form of earthen mound.

Strucutral Stupas in Maharashtra and nearby

So far Maharashtra is concerned the structural stupa complex at Pauni is well known with two different architectural layouts (Deo and Joshi 1972). Mansar is another stupa site of brick constructed structure from the same region (Joshi and Sharma 2005). Adam has also yielded a mud stupa dated to 1st century AD (Nath 1989-90). Apart from these three stupa sites concentrated in Vidarbha region, two more sites have yielded structural stupas and they are Ter (IAR 1968-69) in Osmanabad district of Marathwada region in central Maharashtra and Sopara (Indraji 1882) in west coast, the Konkan region of Maharashtra. These stupa sites belong to late Satavahana period (1-2nd century AD).

All these structural stupas are constructed in bricks except Adam, which is made up of mud. With the addition of recently discovered Stupa from Bhon, the earliest date of Buddhist Stupa in Maharashtra may goes back to 3rd century BC as per ^{14}C dates from Bhon followed by Pauni, Mansar, Ter, Sopara, and Adam (Fig.1) respectively with chronological ascending order.

Pauni (20° 48' N; 79° 39'E) is located on the right bank of the river Wainganga in Bhandara district of Maharashtra and it is excavated by the Nagpur University and the Archaeological Survey of India in 1969-70. It is one of the largest stupa in diameter revealed 3 stages of construction of which 2 were of building and third one of repairs and renovations. The original stupa of earlier period was of 38 m in diameter and enlarged to 41 m mostly in post Mauryan period i.e Shunga- Satavahana. This unique monument simple in nature, unassociated with any sculpture, gateways, or *pradakshina patha*, spoiled in course of time with flood (Deo and Joshi 1972, Deo 1974).

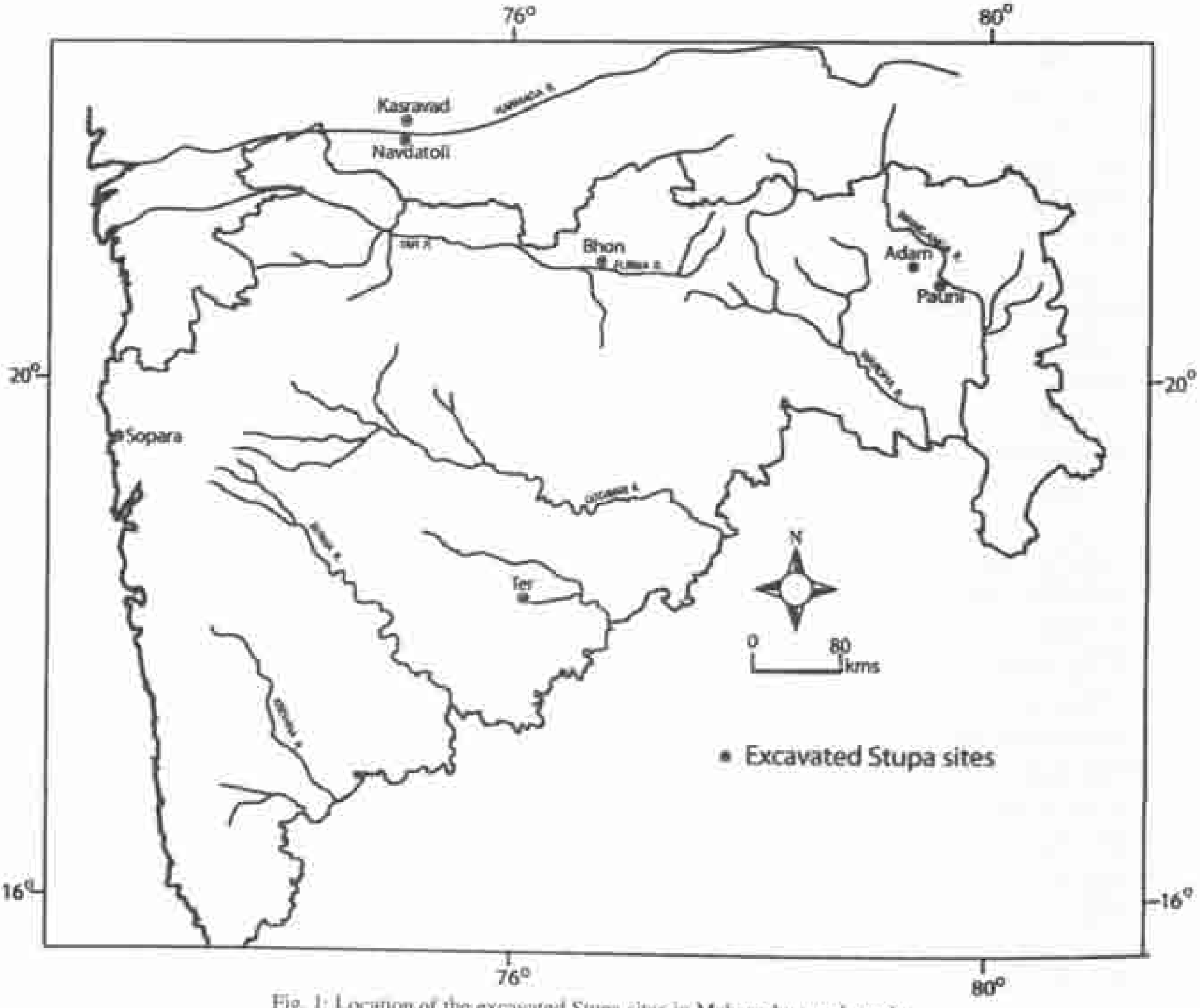

Fig. 1: Location of the excavated Stupa sites in Maharashtra and nearby.

Mansar Stupa (21° 24'N; 79° 17'E) was discovered at Hidimba tekadi of Mansar in Ramtek taluka of Nagpur district, Maharashtra at the depth of 3.9 m over the bedrock having 8 m diameter. The size of brick is 46 x 22 x 7 cm. The fallen debris in a specific manner is an evidence of the destruction of stupa due to earthquake. Immediately another stupa was built using box technique with 34 courses of brick. The base and knob of a lime stone relic casket were recovered from the area of stupa. On the basis of construction they were dated to the late Maurya and the early Sunga period. (Joshi and Sharma 2005).

Sopara (19° 25'N; 72° 47'E) is one of the earliest excavated structural stupa in Maharashtra (Indraji, 1882) with rich findings in stone chamber possessing 4 caskets of copper, silver, crystal and gold containing gold flowers, bits of potsherds (believed to be pieces of the begging bowl of Buddha), semiprecious stones, green glass, little gold leaf and silver coin of Gautamiputra Yajna Satakarni (c.174-203 AD). It is presumed that the coin belonged to the original construction while the bronzes and gold plaque with the figure of Buddha and possibly the copper casket were deposited in about the 8th - 9th century AD when the stupa probably underwent repairs or reconstruction (Mitra 1971).

Ter (ancient Tagar) (18° 19'N; 76° 12' E):This is located in Osmanabad district and excavated by the Director of Archives and Museums, Maharashtra State in 1967– 68 and found the base of large brick stupa, 26 m in diameter and resembling a *chakra* on plan with *pradakshina patha*. The stupa can be dated to the first half of the second century AD on the basis of an inscription recording the names of masons and a coin of Pulumavi. So far the recovery of antiquities are concerned Ter seems to be one of the richest site yielding variety of antiquities ranging from terracotta and kaoline figurines, Roman clay bullae, beads of various shapes in carnelian, agate, lapiz lazuli and shell (IAR 1968-69).

Adam (21° 00' N; 79° 28' E) is located in Kuhi taluka of Nagpur district and marked with remains of a circular mud Stupa. The stupa consisted of *medhi* (radius 17.3 m) and *anda* (radius 10.3 m) with basal remains of *hermika* (3.5 m). Ringstone for supporting yasti of a chhatravali was found and did not yield the expected relic casket. After the basal clay, the earth of habitational deposit, *murum*, rubble, stone chips, sand etc. were heaped up without any specific pattern of dumping. On the basis of inscribed and uninscribed cast coins assigned to later Satavahana rulers, it is dated to 1st century AD (Nath 1989-90).

Navdatoli /Maheshwar (22° 11' N; 75° 36' E) In spite of its out of Maharashtra location, this has been incorporated here because of its stupa site which has got great resemblance with the stupa from Bhon.

The site of Navdatoli is situated on the left bank of river Narmada in Madhya Pradesh. The structural brick stupa was located on a circular mud platform measuring 26 m outer rim. The circumambulatory passage (*pradkshina patha*) is 1.7 m below the height of the mound. A number of bricks (50 x 28 x 8 cm) of the drum portion have single Brahmi letters of the Asokan type suggesting age of 3rd century BC. One NBP sherd was found below the mud platform which helped to date the stupa to 3rd century BC together with the brick sizes and incised Brahmi letters on brick. The Stupa at Kasravad located about 6 km. SE of Navdatoli also belongs to the same period (Sankalia *et al*. 1958).

Bhon

The site of Bhon (20° 55'N; 76° 39'E) is situated 30 km north of Shegaon on the right bank of the river Purna in Sangrampur taluka of Buldana district, Maharashtra (Fig.1). The modern Bhon village is situated in the meandering loop on the right bank of the river Purna. A major part of the ancient habitation deposit is occupied by present village. The habitation deposit also appears extended to the west and south of the village. Several ring and brick wells as well as remnants of brick structure are observed in the village area. The trenches were laid in the area to the west of the village, presently under cultivation (Fig. 2). The ground relief and depression has formed the natural boundaries for habitational mounds dividing them into mound I to VII. The structural remain of stupa is found at mound VI which is located about half a km further west of the mound I near a acute meandering arm, is a part of modern flood plain now under cultivation.

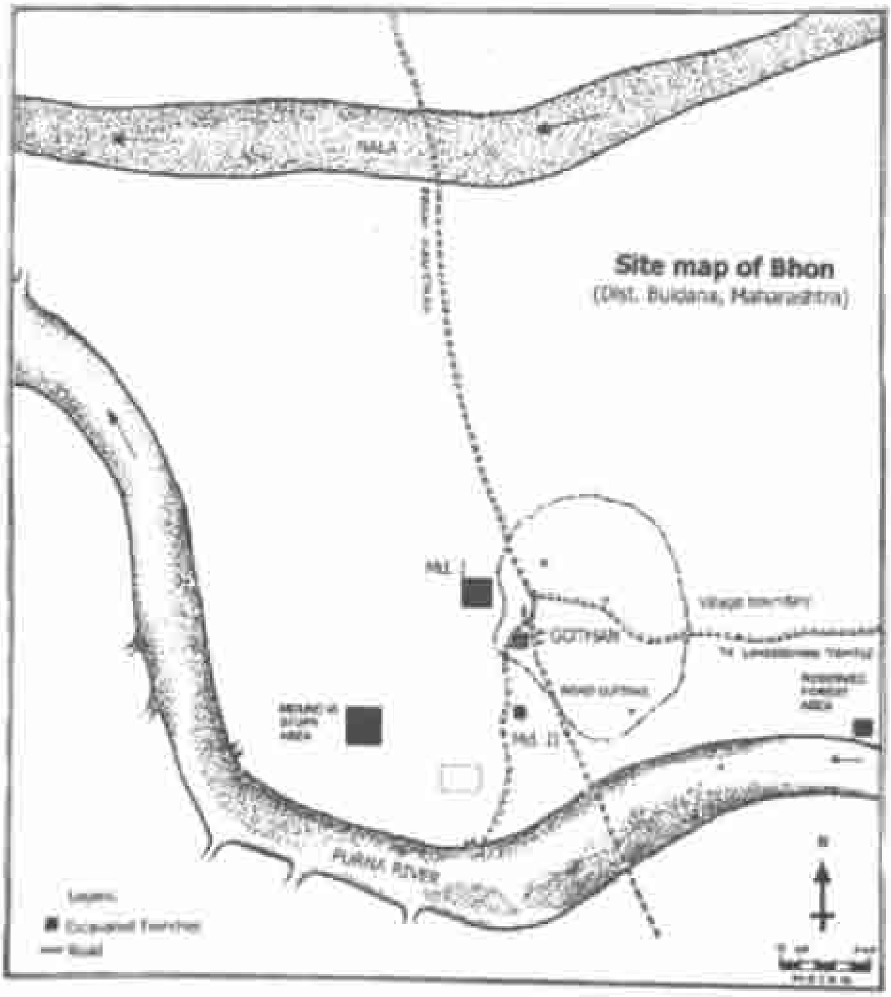

Fig. 2: Site map of Bhon showing excavated area.

Last three-four seasons' excavation have brought to light an urban trading centre of pre-Satavahana period and striking discovery of structural Stupa remains with other relevant antiquities (Deotare 2006, Deotare 2007). More than 50 coins were found at the site in the course of excavations and explorations of which except three, all are uninscribed. The one of the inscribed coin has the legend SADAVAHANA collected from the upper horizon of Gothan is ascribable to early Satavahana type on the basis of its paleography. The finding of degenerated form of NBP (Northern Black Polished Ware) confirms that the site belongs to the period prior to the beginning of Christian era. The RPW (Red Polished Ware) has also been recovered at the site which appears to co-exist with NBP. The striking similarity is observed in decorated panels from Bharhut displaying ornaments of Shunga period (Cunningham, 1879) and the decorated terracotta beads, spacers and *tri-ratna* pendants recovered from the site of Bhon (Pl. 1). The size of rectangular bricks is also very well comparable with that of reported from Navdatoli and Kasravad in Madhya Pradesh, implies that the site has witnessed flourishing period from c. 3rd century B.C. to c. 1st century B.C.

The Stupa at Bhon

Initially in a trial trench of 2 m x 2 m, structural remains of stupa were partly exposed in the form of well fired bricks arranged in criss-cross/semi-circular pattern in excavation season of 2002-03. Due to semi-circular brick pattern it was initially thought that it could be either a part of fortification wall or a watch tower (Pl. 2). Subsequently in 2004-05 the trenches were expanded to trace out the extent of the structural remains and complete circular feature of stupa was brought to light. In later stage four trenches measuring 2 m x 2 m were laid down in the four directions of the structure. A well prepared brick platform was encountered in all four trenches arranged in circumambulatory form (Pl. 3). In 2005-06 the above trenches were expanded and the entire platform in the north-west and south-east quadrant of the stupa was exposed giving an idea of the complete structure comprising dome, drum and *pradakshina patha* (Pl. 4).

The overall diameter of the stupa remains is 14 m including *pradkshina patha* and drum (a base of dome). Since the area is under cultivation, only the portion of the drum of 1.8 m height and *pradakshina patha* is in relatively well preserved condition. The dome is completely missing. The bricks used in the construction were made locally as it is clear from the brick manufacturing locality found on the bank of the river near Lingeshwar temple around half a kilometer away to the east of the site.

In the course of excavation the fallen debris of bricks was encountered after removing the silt of around half a meter thickness from the peripheral portion of the dome. The debris contained the broken and complete bricks. Some of them evidently made for specific purpose as these are wedge shaped and one of the broad side of it has slanting angle ranging from 23° - 84°, if arranged one above another will form the shape of a dome. This fallen debris of bricks appears to be resting on the deposit formed of compact silt of average half meter thickness containing brick bats and some percentage of lime. Although it is not in uniform thickness all around, on the basis of its compactness and heterogenous nature seems to be deposited intentionally for some purpose. The small grade gravel of about 30 cm thickness is observed resting on the *pradakshina patha* and underlying the above described compact silt deposit. The gravel is devoid of cross bedding feature and containing unabraded cultural material like pieces of bricks, tiles and pottery indicating lack of transport of the material due to river activity. Two well preserved coins were also recovered from the gravel.

Pradakshina patha

The *pradakshina patha* is around 1.75 m in breadth formed of five rows of bricks of which the bricks in first innermost row are arranged lengthwise in circular pattern. These bricks are of very specific sizes, with the slight curve in length, the inner side measures 49 cm, the external 51 cm and breadth 26 cm and thickness 8 cm. The bricks in next two rows are wedge shaped arranged breadth wise in circular pattern. The bricks of almost uniform sizes 40 x 26 x 22 x 8 cm appear in north-west portion, but the bricks used in south-east portion are vary in sizes, and, the most commonly used one measures 52 x 28 x 24 x 8 cm. The bricks of fourth row are arranged length wise but are not of uniform sizes. The particular attention also appears to be paid in the preparation of bricks of the last row. These differ in size and shape from the bricks encountered at the site. Measuring 54 x 30 x 26 x 8 cm, these are fashioned with slight outcurve and slanting edge towards external end of the bricks (Pl. 5). Each brick of this row is fashioned with incised symbol made with finger tip when the bricks were wet. The symbol in both portion, north-west and south-east part of *Pradakshina patha*, are different and intervened with *brahmi* _ depicted on some of these bricks. The common symbol observed in south-east portion is triangle resting on half circle with three projecting lines inside (Pl. 6) and the symbol identical to present devnagari ';' appears in north-west part. Palaeographically, these symbols have not been reported so far from any Early Historical site of the region. Similarly symbolic representation of a single brahmi letters of Asokan type on the bricks has been reported from the stupa sites of Navadatoli and Kasrwad in Madhya Pradesh (Sankalia et al. 1955).

Drum (*medhi*)

Inside the innermost row of *pradakshina patha*, another row of bricks of same size and arrangement has been observed with two more courses, the lower course is made up of mud mortar and upper one is of burnt brick. This row has been raised by 16 cm in height which is prominently preserved in south west quadrant and this portion has been identified as a basal part of a drum (*medhi*).

The base of the dome measures 10 m in diameter. The bricks and mortar prepared of lime, brick bats and small grade gravel has been used as construction material and black clayey material as binding medium. The every two courses of burnt bricks are intervened with a layer of mud mortar of the same thickness of a burnt brick.

Dome (*anda*)

Specific brick types having a slanted edge at one elongated side have been recovered in significant numbers at 60 cm depth in the form of scattered brick pieces as if fallen from top or dome or dumped all along the periphery of the stupa. These angled bricks ranging from 23° to 84° seem to be used for the construction of dome and the height of the dome may likely to be around 5 m from the drum platform. The overall morphological feature of the stupa can be reconstructed on the basis of recovery of angled bricks, 2 m height of drum platform, and 10 m diameter of the stupa (excluding 4 m *pradkshina patha*). The total height of the stupa from the base would have been around 7 m consisting of, from bottom upwards, a *pradkashina patha* at the base followed by the drum or *medhi*, *anda* and *yasti*. There is a possibility of hemispherical dome of brickwork with a terraced drum at the base. So far we could not get evidence for *chhatravali* but it may most probably made up of wooden panel as found at most of the stupa sites in India. The post-holes at specific distances on the outermost row of *pradkshina patha* point toward a wooden railing around the Stupa.

A small trench of 1 x 1 m was taken at the centre of the stupa with a view to ascertain casket if any. Twelve courses of bricks arranged lengthwise and breadth wise in alternate pattern were found having 10 cm diameter hole exactly at the centre most probably seems to be for *yashti* (Pl. 7). Besides, a few pot sherds, a bone point and lot of charcoal have been recovered at the bottommost level without any casket. The charcoal recovered at the bottom was dated to 2180±90 years BP by the Birbal Sahni Institute of Palaeobotany, Lucknow.

The pit (approximately 0.5 x 0.5 m) which was filled with brick pieces further down to the virgin soil is observed to the immediate south of the exposed above central pit of intact structure for *yashti*. The destruction approximately in the middle of the stupa, filled with broken brick pieces negates the possibility of destruction by natural process and can be associated with human activity. It is, in fact, difficult to arrive at any conclusion for such destruction and the period of it. However, since the pit is approximately in the middle of the stupa, one may be tempted to associate it with an attempt of removing the relic casket, if any, from the stupa structure.

Special features of the stupa at Bhon

Specific brick shapes are being used in several parts of the stupa structure displayed outstanding architectural skill of the builders. It seems as if the entire plan of the structure was ready and the bricks used in the construction of stupa were manufactured as per requirement.

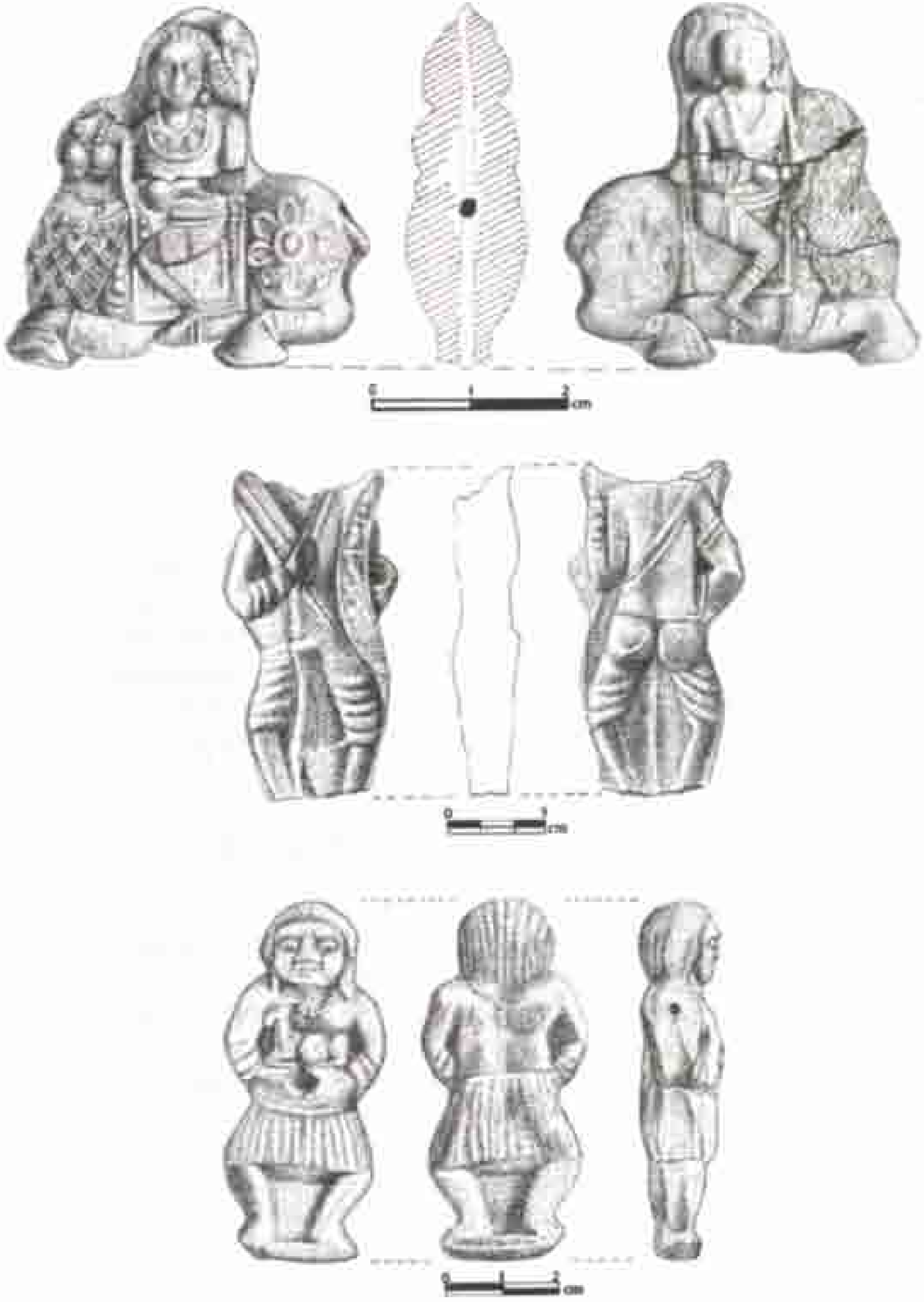

Fig. 3: Terracotta human figurines from Bhon.

Chronologically the structural stupa at Bhon is of 3rd century BC likely to be the earliest one in Maharashtra and structurally and technically very well comparable with the stupas from Kasravad and Navadatoli in Madhya Pradesh in respect of the construction technique, brick size, unidentified symbols on the bricks of stupas etc. So far structural stupas from Maharashtra is concerned, they are within the range of 2nd century BC to 2nd century AD dated exclusively on the basis of recovery of contemporary material remains like NBPW, coins, inscriptions etc. while stupa at Bhon has been dated on the basis of ^{14}C dates on charcoal as well as the recovery of un-inscribed copper coins and NBPW.

Several stone objects from Bhon has been recovered during the course of excavations, most notable are two dumbel shaped muller of basalt with typical Mauryan polish and one legged quern engraved with auspicious symbols like *swastika, nandipada* (taurine) and a pair of *mina* (fish) (Pl. 8). Similar type of legged quern having engraved symbols have also been recovered at Nasik dated 2nd century BC (Sankalia and Deo 1955) and Adam belonging to Mauryan period (Nath 1989-90). Thus the above stone objects from Bhon can undoubtedly be placed in the pre Satavahana period.

So far as the recovery of total number of terracotta objects are concerned Bhon seems to be a major manufacturing center with prominent recovery of varied TC objects. These terracotta objects comprises of human figurine of warriors, composite figure, beads of various shape and sizes and most prominent are variety of pendants and amulets, made up of fine clay and well fired. The composite figure consists of a body of a lion in seating position having upper portion of female body and male rider. There are three human figurines of warriors in broken condition but very fine features are visible indicating high quality craftsmanship. Similarly a standing human figure holding animal (probably deer) in his hand with fine details of his face as well as cloth pointing towards *yaksha* (Fig.3).

Another terracotta objects found at Bhon in sizable quantity are *Tri-ratna* (taurine) or three jewels which are highly worshipped by Buddhist as it is believed to represents the Buddha, the Dhamma and the Sangha. They are in different sizes, plain as well as decorative, both forms are quite common (Pl. 9). The nearby area was also exposed in order to locate any feature related to stupa. A brick wall was found with one unusually long brick of 70 cm length and white burning patches indicating lime-manufacturing area, probably used for plastering purpose.

The recovery of a rich series of antiquities, huge extent, different activity areas such as tile manufacturing, brick manufacturing, pottery and terracotta bead manufacturing etc and a large size structural remains such as stupa indicate that this site is one of the largest pre-Satavahana sites in Maharashtra as well as important regional center, trading town situated in the Purna basin on the ancient trade route of *Dakshinapatha*.

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New Evidence on the Maritime Activity at Dabhol on the Maharashtra Coast

A.S. GAUR, SUNDARESH, SILA TRIPATI AND K.H. VORA*

Maharashtra has a coastline running over 720 km along the Arabian Sea extending from Dahanu and Bordi in the north up to Goa proceeding southwards. Bays, creeks and rivers offer a number of safe harbours and anchorages along the Maharashtra since time immemorial. The Greek unknown writer of the Periplus of the Erythrean Sea mentions a chain of the port towns along the Maharashtra coast. These are Sopara, Kaliyana, Chaul, Dabhol, Vijaydurg and Vengurla.

Dabhol is situated at the confluence of the river Vashishthi and the Arabian Sea (Fig.1). The river Vashishthi originates from the Western Ghats and takes a narrow and meandering course before joining the Arabian Sea at Dabhol. Many minor tributaries and rivulets join the river during its course to the sea. This was one of the most active ports during the medieval period. Dabhol has been referred as *Palaepatmae* by the author of the Periplus of Erythrean Sea. Schoff (1912) has suggested "Palaepatmae is probably the Sanskrit *Paripatana*-the suffix meaning town while *Pari* was a general term applying to the western Vindhya Mountains and the coast south of them".

Dabhol was of great importance in the 14th, 15th and 16th centuries. It used to be the principal port of South Konkan region, carrying on trade with ports in the Mediterranean, the Red Sea and the Persian Gulf (Brown, 1902). During the 13th to 15th centuries this port was ruled by the Bahamani Dynasty and was known

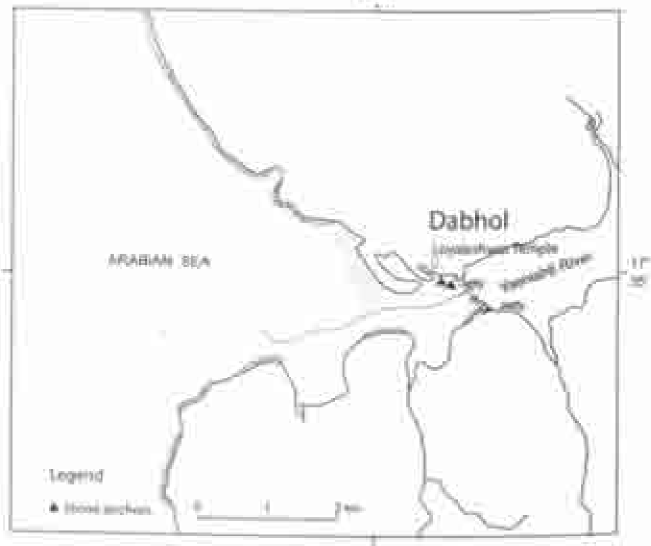

Fig. 1

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as Mustafabad (Burgess, 1872). Later on, it was called Hamjabad and then Dabhol. There is a mosque called *Anda Masjid* standing close to the port with a dome and minarets, which was built during the regime of Adilshah. This is the only specimen of pure Saracenic architecture in the Southern Konkan. It is said that Adilshah's Begum spent around 1.5 million rupees in Indian currency for the construction of this mosque. Dabhol was the capital of a province of the Bijapur kingdom under Yusaf Adil Shah.

Nairne (1896) quotes a Portuguese historian of the16th century, who described Dabhol as "one of the most magnificent and populous maritime places of those parts, full of noble houses, fine building, superb temples, and old mosques, one of which with vaulted roof standing on the hills above the town was destroyed in 1557". Further he quote another Portuguese historian who mentioned "..... from December to March there was a great commerce between the ships of Malabar and Cambay, which met here and exchanged their commodities, while great carvans of bullocks loaded with goods came down from the interior. They went back with wheat and rice grown in the Konkan. A route is mentioned from Bijapur to Dabhol by the Kumbharli pass, and on account of the traffic along this road Chiplun is said to have been a great village and very populous, stored with all manner of provisions. The importation of horses from Mecca, Aden and Ormuz is also mentioned. When Dabhol was first attacked by the Portuguese there were 6000 troops in garrison, but the defence were slight".

Geologically Dabhol is a part of Deccan traps consisting of hard and undulating basalt and laterite formations with scattered alluvial and laterite soil cover of varying thickness. The hill formations around Dabhol are mainly laterite and are as high as 250 m. The hills steep down to the coast and on certain occasions terminate into cliffs.

Legends on Dabhol

Crawford (1909) has mentioned that from the port of Dabhol a large number of pilgrims use to undertake voyages to Mecca during the medieval period. Further he mentioned *"The Mughal had long held the port of Dabhol and built docks and jetties on the bank of the sacred Washisti, and masques innumerable. Fleets of heavily armed ships left annually for the Red Sea and the Persian Gulf after Gokul Ashtami, laden with rich mechandise, costly silk and shawls, valuable spices and oils, richly inlaid arms and armour; in a word, all the paraphernalia of a wealthy and luxurious race. The larger craft such as Shibads, Dhows and Gallivats being of deep draught could not get up above the junction of Jogburi river with the sacred Washisti, but lay at anchor in deep water in the land locked basin at Dabhol.* This reference indicates that Dabhol was very active maritime trade centre along the central West coast of India during the medieval period.

Dabhol has been mentioned along with Chaul as an important port town and trade centre. Dabhol has also been referred as the great meeting place of all nations living on the coast of India (DeBarros, 1778). Dabhol was indeed great commercial marts, with a large trade with Persia and the Red Sea, by which route the whole of the Indian goods designated for Europe then passed (Nairne, 1896). Ships of 1200 tons of cargoes were able to enter in the creek.

Loyaleshwar Temple

Marathi word Loyali means an anchor used even today by the fishermen across the Maharashtra and Gujarat coast. This is the first instance along the west coast of India that a temple dedicated to the anchor, is still a living temple. The temple is situated just on the one corner of the present jetty of Dabhol. The temple has been renovated and marble and granite flooring and wall tiles have been used. However, tradition suggests that the temple is at least 200 years old. An iron anchor of a long sank with square section is placed in the *Garbhagriha* (sanctum) and is being worshipped as god. The style of anchor appears to be of the British admiralty type of anchor. It has a ring at the upper end. The lower two prongs are buried whereas entire shaft is exposed and painted in red colour (Pl. 1)

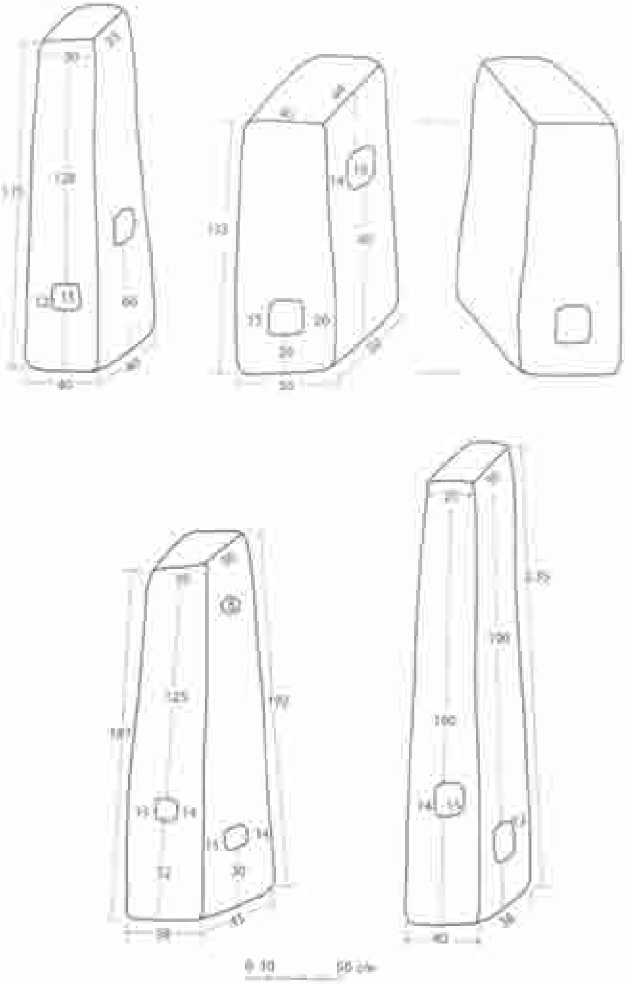

Fig. 2

A shallow seismic survey of Dabhol creek suggest a depth ranges between 1.5 to 18 m. The seabed in large part of the area is even and gently slopping. A sand bar was observed in the centre of the creek and it extend offshore ward. The bar is about 2.7 km long and 0.9 km wide with water depth ranging from 1.5 m to 4 m. (Naidu, 1987).

The present paper deals with the discovery of stone anchors in the Dabhol creek in 2003 during a dredging of the channel. The information regarding stone anchors was published in a daily newspaper. A team of the Marine Archaeology Centre of the National Institute of Oceanography, Goa visited the site at Dabhol and gathered information regarding the stone anchors. This is the first analytical report of stone anchors of Dabhol that provide the vital clue on the prosperous maritime activities of this region

Result of Survey

Onshore and inter tidal zone explorations were undertaken in and around Dabhol jetty. Towards the eastern side of the present jetty a few remains of ancient jetty are noticeable (Pl. 2). This consisted of basalt block in linear alignment. Besides the remains of an ancient jetty, a few Islamic and Chinese ceramics (Pl. 3) were also examined which was collected by Anna Shirgaonkar a respectable citizen of Dabhol. The pottery appears to be of the late medieval period.

Stone Anchors

The stone anchors have been found during dredging for making a ferry boat jetty in 2003 (Fig. 2) Since then, the anchors are lying in front on the Custom Office of Dabhol. One of the anchors had wooden flukes remain in the holes, which were removed and kept safely with Shri Anna Shirgaonkar an active Social worker at Dabhol. These are typical Indo-Arabia type of anchors and are similar to those reported from Dwarka, Bet Dwarka, Miyani, Visawada and Mithivirdi on the Saurashtra coast (Gaur et al. 2005).

Description of anchors

1. Perfectly shaped, Indo-Arab type anchor with lower portion broad and tapers upper side. It lacks upper hole, whereas two lower holes are intact (Pl. 4). The chisel marks are noticeable on the entire surface including the holes. The holes are perfectly cut and no indication of any erosion is noticeable. The lower holes yielded two pieces of wood, which may be the remains of flock. Though surface is rough but more or less it is even and has sharp edges. The barnacle growth over the anchor was also noticed.

2. The lower portion of the Indo-Arab anchor with 2 lower holes (Pl. 5). It has an uneven surface and blunt edges. Interestingly, holes are not finished one of them is not a cross hole (12 cms deep) and the second hole is 18 X 20 cm on one side and other side smaller in size (15 X 12 cm). This indicates that anchor was being under preparation on board itself.

3. This is the longest among the 4 anchors noticed at Dabhol (Pl. 6). It is slightly curved toward the upper side. Chisel marks are noticed on the surface. The most striking point of this anchor is the quarry marks and all together there are 18 marks on one of the 4 edges. The width of mark is 4 centimeter and distance between 2 marks is 5 cms. The anchor has two holes one each rectangular and square. It lacks upper circular hole.

4. This is one of the finest finished anchors with complete in shape (Pl. 7). The entire surface of the anchor including all holes has chisel marks. The anchor has all holes including an upper circular and lower 2 rectangular holes. It has a rough and even surface and blunt edges. The barnacle growth is also noticed. It is made of granite/ basalt stone.

Discussion

Though, Dabhol has been identified with *Palaepatmae* of the Periplus of the Erythrean Sea, but it was much more prominent trading centre during the medieval period as several travellers have mentioned about its prosperity (Habib, 1982). The archaeology of this region dates back to the early centuries of the Christian era as a few caves at Panhale Kaji were discovered near Dabhol (Deshpande, 1986). Travellers have also mentioned frequent destruction of the town by the Portuguese and later by Shivaji of the Maratha dynasty. Dabhol also witnessed the early Arab settlers as evident from the presence of several mosques in the town and a large number of people of trading community particularly of Muslim population are the testimony of the Arab domination at this particular port.

The location of the town favours for a sheltered harbour. The geophysical exploration also indicated that this can serve as a safe harbour. The Vashishthi river is

Table 1. Detailed measurements of the stone anchors from Dabhol.

Sr. no.	Material	Length	Width	Thickness	Upper hole	Lower holes
1.	Boxite	175	40/30	40/25	NA	13X15, 14X15
2.	Sedimentary rock	135	50/45	45/44	NA	18X20, 17X18
3.	Basalt	235	38/30	40/25	NA	15X17, 18X18
4.	Basalt	192/187	45/30	38/30	9	12X14, 12X11

navigable up to Chiplun, which was historically a market place (Nairne 1896).

The development of present harbour witnessed the loss of the remains of old jetty and other structures in relation to maritime activities, however, a few places some remains are noticeable and those indicate some construction pattern. The blocks of basalt (Deccan traps) were frequently used in the construction of jetties and same tradition even today continued but with fine dressed blocks. The construction of jetty was as usual the perpendicular to the shore unlike present jetty parallel to the coast.

Discovery of anchors from Dabhol creek is one of the significant finding to support the historicity of the place as a port or harbour. These anchors have been identified as Indo-Arabia type and dated to the medieval period. The anchors are very similar to those reported from various place across the coastal sites of India and the other Indian Ocean countries, including Dwarka (Sundaresh *et al.* 1999), Bet Dwarka (Sundaresh *et al.* 2001), Miyani and Visawada (Gaur and Sila 2006), Somnath (Gaur *et al.* 2002), Mithivirdi (Gaur *et al.* 2005a) in Gujarat coast, Vijaydurg (Sila *et al.* 1998) and Sindhu durg (Sila and Gaur, 1997) in Maharashtra coast and Goa (Sila *et al.* 2003) and Kerala coast (Sila *et al.* 2005) also have a few similar stone anchors. Besides Indian coast a large number of anchors are reported from Oman (Vosmer 1999, Agius 1999), and east African coast (Chittick 1980).

One of the anchors has the quarry marks and that leaves no doubt on the understanding of technique of obtaining raw material, which is similar to that of ancient India. The chisel marks are so clearly visible that the size of chisel can be estimated. The width of one mark is about 5 cm and similar width is the distance between two marks. The raw material of 2 anchors appears to be the basalt of Deccan traps and remaining 2 anchors are of some sedimentary rock. One anchor is half finished as one of the holes could be partially chiselled. This evidence indicate that chiselling process even continue on board also. The presence of wood in the fluke hole confirmed our earlier notion about the wooden fluke in the lower holes of the anchors.

So far the dating of the anchor is concern, the anchors from other sites have also not been found associated with stratigraphy and therefore we have to rely upon comparative findings. Elsewhere, we have argued (Gaur *et al.* 2004) that Arab navigators were responsible for the introduction of these anchors and later they were so popular along the Indian that almost each and every medieval port has the remains of such stone anchors. Interestingly, Arabs reached up to the China and they were also active in the Mediterranean but these areas are devoid from such examples. Indeed, China and other eastern countries may need extensive coastal and offshore explorations to find such remains and the Mediterranean have a very few examples. However, the countries around the Indian Ocean have preserved a large quantity of such type of anchors and presently India is leading in the score of finding of stone anchors.

The temple of Loyaleshwar is a unique tradition of Dabhol, which is not reported from anywhere in the Indian subcontinent. However, stone anchors from Mithi Virdi (Gaur *et al.* 2005) in Bhavnagar are locally called as "cot of Bhima" (*Bhima ka Khatiya*) a character of Mahabharat but they are not worshipped like Loyaleshwar of Dabhol. There are instances of anchor worship on the eastern coast of the Mediterranean (Frost 1973).

Conclusion

In literature, Dabhol and Chaul often mentioned together. Presently, Chaul is a small village near Revdanda whereas Dabhol is a big fishing harbour as well as overseas trading with small vessels is continuing even today. The present harbour is built over the older

Bandar. Therefore, the remains of an earlier jetty are meager. The discovery of the stone anchors from Dabhol creek have added to authenticity of travellers documents, that once upon a time Dabhol was a busy port town on the Konkan coast. Further underwater exploration in the Dabhol creek may yield the remains of some early medieval period shipwrecks.

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Need for a Comprehensive Plan for Conservation of Wall Paintings in India

O. P. AGRAWAL*

There are thousands of wall paintings available in different parts of India, dating from the prehistoric time to present day. Some wall paintings are well known, like the caves of Ajanta, Ellora and Bagh. We have paintings in Badami in the Bijapur District, Karnataka. There are 9th century paintings of very great artistic beauty in Jain caves at Sitanavassal in Puddukkottai District of Tamilnadu. Besides these well known paintings, there are thousands of others, which are equally important but comparatively less known. There are many wall paintings, the importance of which is not clear even to the local people of the area.

In every state of India we find a large number of wall paintings in temples, palaces, houses, churches forts and so on. In Karnataka, for example, we get beautiful wall paintings in the *Rangamandapa* of Virupaksha temple at Hampi. The *Rangamandapa* was constructed by Krishna Devraya in 1510 A.D. in memory of his coronation (Nagaraja Rao 1989). There are some murals of Adil Shahi period in Assar Mahal, Bijapur. All the walls and ceilings of this palace are painted in decorative designs (Nagaraja Rao 1989). There is evidence of Adil Shahi paintings in the village of Kamatgi about 17 kms from Bijapur. There are so many other wall painting sites in Karnataka, like the Jain Math at Shravanbelgola and Naragunda Palace in the district of Dharwad. Similarly, there is a very strong mural art tradition in Kerala (Nair, Velayudhan, 1989). According to a survey conducted by the INTACH and Indian Council of Conservation Institutes, there are over hundred wall painting sites in Kerala.

Status of Conservation

Thus we can see that there is a continuity of painting tradition in India from very early time to present day, but unfortunately enough attention has not been given for preservation of many of them. In many places, one can see plaster along with the paint falling away (Pl.1 and 3). In several of them cracks are found (Pl. 2) and deposit of smoke, dirt and other accretion is commonly found (Pl. 4). One can see excreta of birds and bats deposited on the surface of many paintings. Roofs of buildings leak, and as a result rain water percolates down on the painted surface (Pl. 5). In several paintings, we find deposits of fungi and algae on the surface (Pl. 6). Insects also cause damage to the paintings.

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*Indian National Trust for Art and Cultural heritage, Lucknow

Quite often, lack of awareness on the part of owners creates unexpected difficulty. Beautiful paintings are occasionally scraped off and in their place new murals are painted. To the lay devotee, it hardly matters whether the painting is old or new, as long as it looks beautiful and complete. If a painting was flaking, a coat of lime or paint was applied thus, hiding the details (Pl. 7). Seepage in damp areas due to capillary action destroys wall paintings (Pl. 8). A deep crack in the wall damages the plaster as well as the paint (Pl. 9).

Microclimate plays a very important part in afflicting damage to a painting. If the interior of a building is too humid or there is a wide variation in the temperature and in the humidity levels, the painting is bound to be affected. Preventive conservation is equally important.

Another very serious problem is damage caused to wall paintings by salts. They appear on the surface of the painting in the form of efflorescence and are transported from the back of the wall to the surface of the painting. Plaster as well as paint becomes brittle and weak due to the effect of salts.

In a living temple or church or any other place of worship, problems are of a different type and are enormous. First of all, there is smoke, due to burning of incense or emitted by *hawans*, or from candles and lamps, which gets deposited on the surface of paintings as soot. Devotees visiting a temple offer *flowers*, *roli* and *chawal* not only to the idol, but also quite often to paintings, leaving marks or scratches or colour, intentionally or unintentionally. By touching, oil or grease is deposited over the paintings. The only solution is creation of awareness and regular maintenance by way of cleaning of smoke, or removing colour marks or scratches, etc.

If a building having murals has become too weak and is nearing collapse with, its walls needed to be strengthened by re-plastering or replacing mortar, there is imminent danger to the paintings, because they may have to be scraped for repair work. Many years back, such a situation arose in Rangmahal, Chamba, in Himachal Pradesh. The walls of the palace had become too weak and were near to collapse. Large-scale reconstruction work in the building was necessary. In such a situation, transfer of mural paintings from the walls, along with the plaster, was the only remedy. There are techniques to do this work, but are to be resorted to, only if no other solution is available (Agrawal & Pathak 2001).

Lack of facility for conservation of wall paintings is another serious problem. There are many more conservation centres in the country now than ever before, but the number is still very small compared to the task ahead. Archaeological Survey of India has a big set up for conservation of wall paintings but the number of conservators available is far too less, to be able to handle all the wall painting sites under its control. There are very few states of India, which have facilitates for conservation of wall paintings. In the non-governmental sector, INTACH has established a network of conservation centers, where work on mural paintings is done but still the number of conservators is very low.

The aim of conservation or restoration is not simply to clean the surface of the painting, fill up the lacunae and stop flaking. In the modern context the aim of conservation is to pass on a painting to coming generation in the best possible manner. A conservator must therefore know materials, be conversant with various agencies of deterioration and principles of life science and so on.

It is necessary that one understands and notes the materials, which -have been used for painting. What was the technique of a wall painting? Is it fresco, secco or ala-gila. Quite often there is superimposition of techniques. At present, besides the governmental circle, facilities for analysis of painting are not available anywhere except at the INTACH and Indian Council of Conservation Institutes (ICCI). This situation needs to be addressed seriously. Even at ICCI, all the necessary equipment is not available.

Need for a Plan

From the above overview of the problems of conservation of wall paintings, it will be seen that there are many problems to be addressed, which need a holistic approach. For such an approach various aspects should be taken into account. Given below is a list of certain actions, which seem essential for saving wall paintings of India:

1. Survey and Documentation

There are many wall painting sites, which are known to us but still there are many, which are not known outside the locality, where they exist. The work of such a survey was taken up by the INTACH Conservation Institute, supported by the INTACH (U.K) trust in some states but it could not be continued for want of further support.

In this survey noting status of conservation is also important. Further efforts for preservation of wall paintings will depend on this preliminary report. The documentation reports should have drawings, photographs, a note on the condition of the paintings, technical details, process of fabrication and also the history of the painting.

2. Investigations

The first step is investigation of various layers and components of the painting, which is a prerequisite for any conservation programme.One has also to investigate scientifically, mechanism of decay of the painting.

3. Preventive Conservation and Site Management

As we have seen earlier, unfavourable climatic conditions and lack of maintenance cause immense decay. It should therefore be examined fully, whether the site is well maintained and the decay is not taking place on account of any loop hole in the management system. For this monitoring of climatic conditions, presence of moisture in the walls, appearance of efflorescence on the surface entrance of birds inside the building, presence of termites or other insects are to be specifically examined along with regular maintenance of the building, the cave or any other structure.

4. Conservation Treatment

This is the most important part of the entire exercise. There are several methods available for conservation treatment and one need not go here into their details. Some excellent books are available on this subject (Mora, Mora and Philippot, 1983; Agrawal and Pathak, 2001).

However, there are several matters, which are controversial. While restoring a painting, a question often arises on whether to remove the effect of natural ageing or not. According to one view point, natural change is a part of the history of the painting and should be retained. On the other hand, there is an opinion that there should be an attempt to bring back the old look or glamour of the painting.

Similarly there is another question: whether old restoration should be removed or retained? The same argument applies here also. According to one opinion, any restoration is a part of the history of the painting and should be retained. The counter opinion is that any later restoration is an addition and not a part of the original, and should therefore be removed.

5. Policy for Retouching

Opinions also defer on the desirability of retouching, or reintegration as it is called these days, of the lost paint areas. If no retouching of the areas is done, the spots appear like eye-sores and give a discontinued appearance to the painting. On the other hand, if they are fully restored, some people consider it to be the creation of a new art form. In some countries, like in Italy, the fallen areas are painted with fine vertical lines, which are not discernible from a distance but are apparent if examined at a close quarter. This question has been raised at some seminars but no solution has been found so far (Agrawal 1995).

A national seminar was held at Lucknow in 1995, in which one full session was devoted to this subject, and several speakers expressed their views. In this seminar, which was arranged by INTACH, the present author said that there are three major approaches to reintegration of colours in wall paintings:

a. Neutral colouring of gaps

The lacunae after being filled are smoothened and given a neutral colour. These always show as patches and break the harmony of the painting.

b. Complete matching of colours

The lacunae after filling up and smoothening are completely retouched to merge with the rest of the painting. It is difficult to distinguish between the retouched areas and its surroundings. This practice raises objections in as much as it falsifies the originality.

c. Hatching

The third alternative is to fill up the lacunae with new plaster and then painting with parrall vertical lines, in such a manner that from a distance the retouched areas cannot be distinguished but on close inspection the difference between the original and the restored parts is visible.

A.S. Bisht discussed the various alternatives of retouching and opined that reintegration system should be such as to minimize the distortion and disturbance of a creation, while respecting the authenticity as well as the historical/archaeological evidence. It treats the losses in such a manner that they do not look like pattern of patches and merges with the ground and becomes its part, so that the original paintings re-emerge as a work of art in one piece (Bisht 1995).

R.K. Sharma, *et.al* has advocated the need for selective approach. They proposed that for a policy of colour reintegration of murals they may be categorized into three groups, namely,

i. Paintings, which are exclusively of historical and archaeological importance.

Any attempt of colour reintegration in such cases is undesirable and they suggest that the present policy of colour reintegration confined to spot on micro-level matching should continue.

ii. Paintings of the walls of temples and monasteries which are in use as places of worship.

These monasteries and temples are places of worship and local sentiments are to be respected. Under these circumstances they favoured a policy of colour integration.

iii. Palaces

Palaces, mural paintings, according to the authors are to be seen as an integral part of palaces. These painting were mostly for decorative purpose, and as such they may also restored by full reintegration. (Sharma, Gupta and Veerraghavan 1995).

I.K. Bhatnagar and C.B. Gupta expressed the opinion that in the case of wall paintings, it is best not to attempt any correction, addition or over painting but to give filled area a neutral colour, which harmonizes with the general line of the painting. In other cases retouching may be done with care (Bhatnagar and Gupta 1995). The debate is still inconclusive.

6. Research

In the field of conservation of wall paintings, there are several problems, which still do not have a solution. It is therefore necessary that research projects in the area of conservation of wall paintings are formulated. Some examples of these research projects are mentioned below:

i. An adhesive for consolidation of detached plaster to the wall.

Quite often a gap occurs between the plaster and the wall and if it is not filled up, there is a possibility of the plaster to fall down. In early days a mixture of lime and casein was used. These days' synthetic adhesives have come up. Even then a better adhesive is required.

ii. There is the need of a proper protective coating to consolidate the paint so that it does not flake.

iii. Some pigments for example, white lead or red lead change to black. It changes the tonal value of the paint. Converting to its original shade is still a problem.

iv. Safe methods for removal of smoke from the surface of the painting are also needed.

7. Training

Conservation of wall paintings is a specialized field and needs rigorous training. At present there is no proper training institute devoted to conservation of wall paintings. The course content could include:

i. Documentation procedures

ii. Knowledge of sciences like chemistry, physics, biology

iii. Techniques of wall paintings and their materials

iv. Graphic and photographic documentation

v. Understanding the causes and mechanism of deterioration of wall paintings

vi. Analysis of wall painting

vii. Methods of conservation

viii. Methodology for research

These are only the basic ideas but they need to be elaborated and perfected.

Need for a Charter

There are several charters promulgated, which lay down policies and standards for conservation, like the Venice charter, Burra Charter, Amsterdam Declaration etc. INTACH adopted a Charter of its own. These Charters however mostly address conservation issues of buildings. There was very little for wall paintings. ICOMOS formulated recommendation for the Preservation and Conservation / Restoration of Wall-Paintings in 2003. There are several issues untouched in this Charter and there is an urgent need for giving a fresh look at this question and adopting a Charter to suit Indian needs.

Conclusion

It will be apparent that there is a large number of wall paintings in India but for want of proper conservation facilities, and dearth of trained and qualified conservators, many of them are decaying fast. It is not enough that one or two wall painting sites are taken up and restored. The Archaeological Survey of India is busy in the conservation of wall paintings under their protection. The need is to prepare a plan for conservation of those wall paintings, which are not protected and are under no one's care. Obviously, several institutions will have to take part in this endeavour. There should be a National Project for Conservation of Wall Paintings.

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A Note on the Enigmatic Triangular Terracotta Cakes

The triangular terracotta cakes are particularly associated with Mature Harappan Culture (Allchin 1993: 235). However the albeit are also known from other temporal settings like in Hakra Ware cultural assemblage at Bhirrana, where it was collected as unbaked specimen (Rao *et al.* 2005: 63), Early Harappan at Kalibangan (Madhu Bala 2003: 231,233) from late Harappan context in Lothal (Rao 1985:15), Dholavira (I.A.R 1992-93: 30) and as surface finds from Moti Pipli, a Harappan affiliated Chalcolithic site (I.A.R. 1992-93: 19), for instance. In this context artificially shaped triangular pottery piece obtained from late Harappan context at Daimabad (Sali 1993:182) is also worth noting. Mackay (1938: 429) tells about them as triangular plaques of indifferently baked pottery. He elaborates further "though their shape, makeup and material are nearly the same, they vary considerably in size; and that they were in frequent use and were home made seems to be indicated by the roughness of their makeup. The dimensions of the triangular cakes are not uniform and are known to be of varying thickness. (Pramanik 2004: 52) The shapes also vary slightly, with specimens having sub-rounded to rounded corners. Another category of flat terracotta cakes is the oval ones known from Harappan context at Juni Kuran (Pramanik 2004: 52), from late Harappan assemblage in Daimabad (Sali 1993: 183) and the oval cakes with pointed end observed at Hulas (Dikshit 1993: 399). Even though the less numerous flat oval terracotta cakes due to its distinctly different shape forms a class apart they are generally mentioned along with the triangular ones (Pramanik 2004: 52), perhaps due to the construed similarity of the function. The triangular terracotta cakes are also associated, due to association of the context of finding and evidently function also, with another terracotta object varyingly described as: ovoids (Rao 1985: 19, 26,27), bicones (Fairservis 1993: 109) circular biconvex terracotta 'cakes' (Lal 1997: 227) 'round ones with a deep finger impression in the centre' (Dikshit 1993: 399), terracotta *mushtis* (Mehta 1993: 168) and most commonly as *mushtikas* (Dales and Kenoyer 1993: 490; Nath 1998: 41). Thus, the triangular terracotta cakes although is generally seen in the Mature Harappan period layers, it has been reported from other contexts too. The moderately varying sizes and slightly varying shapes, the compulsion to replicate the same by shaping it on potsherd (as at Daimabad), its supposed alternative the flat oval ones, its frequently associated object, namely the *mushtika* and the very wide range of contexts in which these are found compounds the enigma of the triangular terracotta cakes.

Association with rituals

The triangular terracotta cakes were purported to have "special significance in connection with ritual bathing or other ablutions" by several scholars including Gordon (Allchin 1993: 235). Allchin herself is of the opinion that the terracotta triangular cakes may have been used in ritual bathing, but according to her, its role appears to have been wider. Several scholars have associated its presence in 'fire altars' to ritualistic purposes. Thus at Kalibangan in the early sixties "terracotta cakes seems to have been used in the performance of the ritual" (I.A.R. 1962-63: 30). By late sixties the fire altar at the site was identified by the presence of "usual contents, viz: terracotta cakes, ash and the cylindrical blocks" (I.A.R. 1968-69: 31). Sankalia (1974: 350) also mentions that "in the center of the pit was a cylindrical or rectangular (sundried or prefired bricks)" and around this central stele of 'fire altar', "flat triangular or circular terracotta pieces, known hitherto as terracotta cakes" were placed. According to Rao (1979: 121; 1985:15, 24, 26, 27) these triangular cakes and ovoid balls "were used for ritualistic purposes" and found in different types of 'fire altars'. The triangular terracotta cakes and *mushtikas* were noticed as offering in 'fire altars'at Rakhigarhi (Nath 1999: 48). Terracotta cakes have also been reported from Tarkhanewala Dera as a part of a square 'fire altar' (Trivedi and Patnaik 2004: 31). Although, the sites and examples mentioned here are only some of the numerous places, wherein terracotta cakes have been associated with 'fire altars', yet one could clearly discern that the two are persistently shown as complimentary to each other for more than four decades now. Perhaps this association of the triangular terracotta cake and fire altars was reinforced after the finding of the triangular terracotta cakes bearing engravings on both sides at Kalibangan. The cake obtained from a "horse shoe shaped enclosure" had "an engraving of goat led by a man on one side, with a deity wearing a horned headdress on the other" (Sankalia 1974: 376).

However, not all 'fire altars' have the triangular terracotta cakes within them or for that matter even other associated cakes. At Rakhigarhi several 'fire altars' (Nath 1999: 48; I.A.R.1997-98: 60) have been identified wherein cakes have not been reported. One of these has burnt shells of fruits, which formed part of the offerings. At Lothal also several 'fire altars' have been identified by Rao (1979: 117) in which although ash, pottery and or bones are reported but the cakes are not mentioned. Thus considering the varying combinations of absence or presence of triangular terracotta cakes with *mushtikas*, with 'fire altars' having central stele, with 'fire altars' without stele and with other varieties of 'fire altars', etc. easy generalizations are not possible. The problem is compounded due to the various permutation and combinations of their occurrence. In fact, the very wide range of occurrence of triangular terracotta cakes is intriguing.

Contexts of findings

The triangular terracotta cakes have been found from a large number of contexts. Besides the well known association of the terracotta cakes with 'fire altars', it has been found in many other contexts. It's associated object in 'fire altars', namely the *mushtikas* have also been found in almost as many diverse settings with or without triangular terracotta cakes. Triangular terracotta cakes have been found at the mouth of kiln at Harappa (Dales and Kenoyer 1993: 490). At Sanghol terracotta cakes have been found in kiln that yielded unbaked potteries (Sharma 1993: 157). Cakes have been reported from potters kiln at Tarkhanewala Dera in association with morsels, ash etc. (Trivedi and Patnaik 2004: 31). Rao (1985:24) reported "an altar like enclosure with terracotta triangular cakes and a stone quern". Nath (1998:41) is of the opinion that excessive concentration of terracotta cakes including *mushtikas* at Rakhigarhi is due to the craft activity. At Nausharo, clay built containers "had terracotta cakes used as heat conservers in the fireplaces" (Jarrige 1994: 288). At Rakhigarhi, a jar filled with terracotta cakes at the base is supposed as a hearth for heating semi precious stones at different stages of workmanship in a lapidary workshop (I.A.R. 1999-2000: 32). Terracotta cakes along with small vases, charred bones and ashes were found within "burial urns" by Tessitori at Kalibangan, during his survey of Rajputana between 1916-1919 (Thapar 2003: 13).

Another place wherein the triangular terracotta cake occurs is as decorations on walls (Rao 1979: 215).

However, like any mundane thing it has been found in such contexts that would not allow any sacredness to be alluded to it. As all sacred objects even if they have lost their ritual value were and are disposed off in a dignified manner but this is not observed in the case of triangular terracotta cakes. Just for the sake of multiple corroborations, similar contexts have been enumerated herein in the words of different authors. Thus, the triangular cakes have been found in " houses and streets" (Mackay 1938: 429), "passages"(Rao1979: 113), "surface of lane", "road" (Sant *et al.* 2005: 53), floors of mud brick houses wherein these have been found in association with ovoid terracotta balls "plastered with mud" (Rao 1979: 83), "rooms paved with bricks or fired terracotta cakes" (Agrawal 2007: 79), as soling material along with mushtikas for raising levels of store houses (I.A.R, 1997-98: 57), etc. Allchin (1993: 235) states that " in addition to their association with bathrooms, terracotta cakes are recorded as having been used as infilling, with and without charcoal, beneath brick paved floors, as hard core for road building as well as a whole range of other situations, all of which suggest diversity rather than specialization."

The occurrence of triangular terracotta cake in bathrooms prompted scholars, including Gordon to suggest its use in "ritual bathing" (Allchin 1993: 235). Pertinently, Agrawal (2007:143) points out that "most houses or groups of houses had private bathing areas and latrines, as well as private wells. The early excavators at both Mohenjodaro and Harappa did not pay much attention to this essential feature". According to him, the recent HARP excavations at Harappa are finding what appear to be latrines in almost every house. Agrawal mentions that, "these sump pot latrines were probably cleaned out quite regularly by a separate class of labourers". At Lothal also a latrine has been identified with a jar embedded in a pavement of brickbats (Rao 1979: 81). However, like Harappa and Mohenjodaro, it appears, at Lothal also, some of the latrines could not be understood in the correct context. Rao (1979: 80) reports of two baths provided with two "inspection chambers" and "that soakage jars also served the same purpose as inspection chambers" did. In the light of interpretations of large jars as commodes as reported from other sites, if not the inspection chambers, the large sized soakage jars from Lothal would definitely have been commodes. Similarly, small square unpaved areas in bathing platforms as seen in plate LXIII and enclosure contiguous to bathing platform seen in plate XL of Lothal excavation report (Rao 1979) perhaps, fitted with commodes then, could have also served the purpose of latrines. Moreover, at Mohenjodaro, Mackay (1938: 155,156 and pl XII d) reported a small room paved with bricks like in bathrooms. The room "3 ft square, carefully bordered all round with bricks set on edge and a recess in the northern wall, 1 ft 9 inches wide by 1 ft 4 inches deep, has a little square platform on each side of it, 1ft above the level of the floor. The faeces escaped through a hole in the wall into a drain in the passage outside". The above bathing latrine complex not only shows that both utilitarian structures were built contiguous and also the fact that not only large jars but small built up structures with vertical slits, holes, pits near bathing platforms could actually have been latrines. Pertinently, had these large jars or sump pots sunk into the floors and the small structures or brick lined pits in or near bathing platforms been identified as commodes earlier, the scholars would not have correlated the presence of triangular terracotta cakes in bathrooms with 'ritual bathing'. Earlier the triangular terracotta cakes presence in bathrooms was recognized but since the latrines contiguous to the bathing platforms were not commonly known its presence obviously in the vicinity of commodes could not have also been known. Had these facts been known none would have given hallowed status, to the triangular terracotta cakes. The less than sublime presence of these cakes could not have been given any use other than just plain bathing. For anyone insistent on 'ritual bathing' even after having better comprehension of the bathing complex structures would have had to give cognizance to perhaps ritual defecation also.

Discussion

The presence of triangular terracotta cakes in contexts, like: as soling material, as part of floor, in streets, passages, and bathrooms and obviously in the conjoined latrines does not enable it to achieve a sanctified status. In fact, its presence in those fire places which otherwise could have been considered as 'fire altars', prejudices one about its defiling presence at a sacrosanct spot. These 'fire altars' with triangular terracotta cakes and its common associate the *mushtikas* therefore has to be the run of the mill, hearths, ovens, kilns, etc. Pertinently, recalling the fact that cakes have been found at the mouth of a pottery kiln at Harappa (Dales and Kenoyer 1993: 490), with some unbaked pottery in kiln at Sanghol (Sharma 1993: 157), in the pottery kiln at Tarkhanewala Dera (Trivedi and Patnaik 2004: 31) besides in jar identified as hearth at Rakhigarhi (I.A.R. 1999-2000: 32), all hint that the cakes were used in places where prolonged heating was required. Nath (1998:41) has suggested that the "excessive concentration of terracotta cakes including the *mushtikas*" indicate to the "intensive involvement of the people in their craft activity". The cakes therefore appear to be primarily used as heat conservers as reported at Nausharo (Jarrige 1993: 288) allowing "air into the kiln and at the same time effectively sealing in the heat" as suggested by Dales and Kenoyer (1993: 490) with reference to the triangular terracotta cakes found in the pottery kiln at Harappa. It appears that the frequent finding of pottery along with the terracotta cakes reinforces the possibility that some of the many types of 'fire altars' were potters kiln for baking different types of pottery. Since the cakes did not have any religious value, it could and did end up in streets, floors, bathrooms, etc. Even the reporting of the cakes being found in "burial urn" by Tessitori at Kalibangan does not gain it any religious value as mundane objects of daily use are routinely found along with burial remains.

The finding of the triangular terracotta cake, from Kalibangan, with engraving on both sides also does not appear to be anything more than graffiti. Admittedly, animal sacrifices to deities are a universal phenomenon, but nowhere the medium in which graphic detail of the deity and part of the ritual of sacrifice forms an offering to the gods. Analogically seen it would appear that the sacrificial chants were not deemed sufficient and like a delivery challan the description of the intended receiver and contents of the package was also sent along with. In fact, the engravings on the broken piece of triangular terracotta cakes are nothing more than, few figures made by any craftsman. Such engravings are commonly seen worldwide both as pre firing and post firing graffiti on pots, tiles, bricks, etc. At Banawali, for instance, Bisht (1993: 119) mentions about "a few clay cakes, nodules and sherds" which have engraved forms and symbols including those of a bull and another of a human body. Recently, Rao(2005: 65) reported a "close replication of the famous bronze dancing girl from Mohenjo-Daro" found as an engraving on a sherd of a thick sturdy red ware. However, neither the jar nor the spot got associated with dancing. Similarly, the engraved terracotta cake piece from Kalibangan, even though found within a horse shoe shaped enclosure is no more a part of rituals related to 'fire altar' than the thick ware sherd with engraving of a dancing girl obtained from Bhirrana (Rao 2005: 65) could be a part of a large jar used in dance.

Another aspect that comes to one's mind is the varying shapes and sizes- albeit in tolerable ranges- the wide variety of settings it is found, the varying presence or absence of associated terracotta objects particularly mushtikas and its replication of the triangular cakes in pottery, all show that there was no rigidity associated with it. While in general, unlike mundane things, objects of religious value do have a high degree of standardization in mediums used, forms of expression and the association of other objects. These are also found only in limited areas not anywhere and everywhere. Sacred objects even if they have outlived there use would never be used in bathrooms and latrines, nor thrown away on lanes and roads or used as soling in floors to be trodden under the foot of men and animals. Earlier, Rao (1979: 215) had described that "it is not safe to attribute cult value to an object on the basis of its shape or just because no other satisfactory explanation is available in the present state of our knowledge." Specifically citing the example of triangular terracotta cakes, he wrote that these "were once considered to be cult objects are found to have been used in flooring and for decorating the walls of the houses."

Conclusion

Curiously, especially earlier, scholars after scholars harped on the standardization achieved by the Harappans but none found the "anything would do" attitude of the Harappans in matters religious, as discerned by material remains, strange. Thus the later degraded contexts of association of the terracotta cakes supposedly used in "rituals", diverse shapes and materials of the central stele in the 'fire altars', within the same time and space constrains of a site did not perturb the excavators as to why this casual attitude when it comes to religion. For the present author, therefore, the 'fire altars' having triangular terracotta cakes and even the *mushtikas*, which also have been noted in less sublime conditions, even if it/they be associated with such fire places which, for other reasons appear as 'fire altars' including those with the central stele are not actually 'fire altars'. In fact, they were fire places built up for different type of industrial uses. However, in the same breath, one should say that there is no validity for blanket objection against identifying 'fire altars' with or without the central stele, but such 'fire altars' then should have some formal attributes with regard to the construction and materials including the stele, across several similar ones at least in the same phase of the site. A clay stele in one altar, a mud brick in another, a baked brick in yet another, a cylindrical *yashti* here and a square one in the adjacent 'fire altar' does not show any uniformity, so necessary for outlining religious practices. Further, such altars should not have the triangular terracotta cakes and its associated object, the *mushtikas* also, within them. The presence of these cakes would deny the fireplaces the sublime aura of 'fire altars' and instead link them with down to earth kilns and hearths that albeit powered the Harappan economy.

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Recent Explorations in the Meham Block of District Rohtak (Haryana)

The block Meham, tehsil headquarter of Rohtak district comprises township of Meham and 24 villages and lies between 28°52' to 29°35' North latitude and 76°13' to 76°35' East longitude and is spread over an area of about 419 sq. kms. It is bounded on the east by Lakhan-Majara block of district Rohtak, on the west by Hansi block-II of Hissar district, on the north by Julana block of Jind and by Kalanur block of district Rohtak on the south. (Fig. 1) Meham is situated about 30 km west of Rohtak on Delhi-Fazilka national highway no.10.

The nomenclature of Meham has been explained in literature variously. In Mahabharata a place name 'Mahittna' is referred (Mahabharata II: 29), which is situated in the west of *Rohitika* (Rohtak) the capital of Yaudheya republic. It was a prominent administrative and commercial centre during the medieval period as there are many medieval monuments including a step-well, fort of Meham and Pirzada Mosque etc. Inscription of Pirzada mosque, which is situated in the town, is dated to 1641 A.D. (1051 Hiz). It refers to the name of place as *Mahim*.

Exploration

The region under present study is rich in archaeological wealth. In order to obtain material remains of the past cultures/civilization, the present author conducted an extensive village-to-village survey of Meham block during May to August 2006 for his M.Phil dissertation. In this region a number of scholars have conducted explorations and brought to light archaeological sites. Silak Ram initiated archaeological investigation in this area (Ram 1972). While conducting excavation at Mithathal Suraj Bhan discovered two sites of Farmana (Bhan 1975:125). Shila Devi brought to light some sculptures from Meham. (Devi 1975: pl. XXX). In 1989, Surender Singh conducted an archaeological exploration for his M.Phil research work and brought to light 25 new sites (Singh 1989: 13-27). Manmohan Kumar, M.D. University, Rohtak brought to light some new sites (Kumar 2006: 196-204).

With this archaeological background the present author explored 70 sites out of which 41sites were placed on the archaeological map for the first time. These site ranges from Hakra Ware Culture to Medieval times. At present most of the sites are under cultivation, not even a single site is intact. Pottery and other associated finds of different cultures were collected from the sites to study different aspects. The distribution of cultural assemblage of Meham block is as given:

Sr. No.	Cultural assemblage	No. of sites.
01	Hakra ware Culture	03
02	Early Harappan	8
03	Mature Harappan	07
04	Late Harappan	31
05	Painted Grey Ware	24
06	Early Historical and Historical	24
07	Medieval	37

Ear.Harp = Early Harappan, M Harp = Mature Harappan, LH = Late Harappan, PGW = Painted Grey Ware, Hist = Historical and Med = Medieval

	Site and Location	Cultural Sequence Size	(in hectare)
1.	Ajaib-I 29°07’153 and 76° 30’25” E	LH, PGW	02.00
2.	Ajaib-II 29°06’45” N and 76° 30’50” E	Med.	01:20
3.	Bahelba-I 29°01’45” N and 76° 23’29” E	PGW, Hist	03.50
4.	Bahelba-II 29°01’00” N and 76° 23’20” E	Ear. Har, Hist	01.50
5.	Bahelba-III 28°50’00” N and 76° 22’15” E	LH, PGW, Hist, Med.	06.50
6.	Bedwa-I 29°14’07” N and 76° 20’10” E	Hist, Med	04.00
7.	Bedwa-II 29°14’00” N and 76° 20’02” E	Cemetery Site Late Mature & Early Late Harappan	00.80
8.	Bedwa-III 29°14’30” N and 76° 19’30” E	PGW, Hist.	02.30
9.	Bedwa-IV 29°14’30” N and 76° 20’10” E	Med.	05.00
10.	Bedwa-V 29°15’10” N and 76° 26’40” E	M Harp, Med.	02.00
11.	Bhaini Bharo-I 29°04’35” N and 76° 14’40” E	Hist., Med.	02:20
12.	B* Bharo-II 29°04’30” N and 76° 13’50” E	PGW, Med	02.00
13.	B* Bharo-III 29°04’45” N and 76° 14’30” E	LH (Bedwa-II type) (Cemetery Site)	01.00
14.	B* Chanderpal 29°08’30” N and 76° 20’00” E	Med.	02.00
15.	B* Maharajpur 29°06’45” N and 76° 14’45” E	LH, Hist	02.00

	Site and Location	Cultural Sequence Size	(in hectare)
16.	B* Surjan-I 29°08'15" N and 76° 17'30" E	LH, Med.	05.00
17.	B* Surjan-II 29°08'10" N and 76° 16'05" E	LH (Bedwa-II type) (Cemetery Site)	02.00
18.	B* Surjan-III 29°10'10" N and 76° 15'45" E	M Harp. LH (Bedwa-II type) 01.40	
19.	Bhaini Matoo 29°08'20" N and 76° 14'05" E	LH, Hist.	01.70
20.	Bharan-I 29°04'50" N and 76° 27'25" E	LH.	02.00
21.	Bharan-II 29°05'00" N and 76° 27'45" E	PGW.	02.00
22.	Farmana-I 29°11'05" N and 76° 20'05" E	Hakra, Ear Harp, M Harp LH, PGW, Hist.	15.00
23.	Farmana-II 29°11'35" N and 76° 23'15" E	Med.	02.00
24.	Farmana-III 29°13'03" N and 76° 21'15" E	Ear. Harp. M.Harp. LH Hist, Med.	08.00
25.	Farmana-IV 29°14'30" N and 76° 21'40" E	LH	02.65
26.	Farmana-V 29°13'40" N and 76° 24'25" E	PGW, Med	01.60
27.	Ganganagar-I 29°05'05" N and 76° 23'45" E	LH, PGW	02.50
28.	Ganganagar-II 29°05'07" N and 76° 23'47" E	PGW	01.00
29.	Gurawar-I 29°07'05" N and 76° 33'20" E	LH, PGW	01.30
30.	Gurawar-II 29°07'30" N and 76° 35'15" E	Hakra, Ear Harp, M.Hap. LH	08.00
31.	Gurawar-III 29°07'25" N and 76° 33'20" E	LH (Bedwa-II type), Hist.	02.50
32.	Gurawar-IV 29°07'25" N and 76° 33'19" E	Ear Harp, LH	03.00
33.	Kharkhra-I 29°02'20" N and 76° 26'40" E	LH, PGW, Hist.	02.00
34.	Kharkhra-II 29°02'20" N and 76° 26'40" E	Hist.	01.50
35.	Kheri Meham 29°02'20" N and 76° 26'40" E	Ear. Harp. M.Harp. LH Hist, Med.	04.00
36.	Madina-I 29°04'02" N and 76° 30'15" E	LH.	01.00
37.	Madina-II 29°02'55" N and 76° 30'05" E	LH, PGW, Hist.	05.00
38.	Madina-III 29°01'50" N and 76° 30'40" E	PGW	02.00
39.	Madina-IV 29°33'20" N and 76° 33'55" E	Med. Hist	02.00

	Site and Location	Cultural Sequence Size	(in hectare)
40.	Madina-V 29°33'45" N and 76° 30'50" E	LH. (Bedwa-II type).	01.70
41.	Madina-VI 29°03'25" N and 76° 30'02" E	PGW	01.50
42.	Madina-VII 29°05'30" N and 76° 32'30" E	PGW	02.00
43.	Meham-I 29°24'50" N and 76° 20'42" E	PGW, Hist, Med.	50.00
44.	Meham-II 29°24'50" N and 76° 20'15" E	Med.	02.00
45.	Meham-III 29°24'30" N and 76° 19'45" E	Med.	01.00
46.	Meham-IV 29°24'20" N and 76° 26'40" E	PGW, Hist.	02.30
47.	Mokhra-I 28°58'30" N and 76° 28'50" E	Med.	02.00
48.	Mokhra-II 29°59'40" N and 76° 29'10" E	LH, PGW, Med.	02.00
49.	Mokhra-III 29°01'00" N and 76° 28'30" E	Ear Harp, LH, PGW.	02.00
50.	Mokhra-IV 28°59'30" N and 76° 27'30" E	Hist.	02.00
51.	Mokhra-V 29°00'40" N and 76° 32'40" E	LH, PGW.	02.10
52.	Nidana-I 29°04'55" N and 76° 35'30" E	Med.	01.50
53.	Nidana-II 29°04'50" N and 76° 35'10" E	Hist, Med	02.50
54.	Nidana-III 29°05'00" N and 76° 38'20" E	LH (Bedwa-II type). (Cemetery Site)	01.00
55.	Nindana-I 29°08'30" N and 76° 44'50" E	PGW, Hist, Med.	02.15
56.	Nindana-II 29°08'50" N and 76° 25'20" E	Med	01.80
57.	Nindana-III 29°08'15" N and 76° 27'40" E	Med.	02.70
58.	Nindana-IV 29°07'40" N and 76° 27'20" E	Med.	01.50
59.	Nindana-V 29°08'55" N and 76° 24'30" E	Med.	01.20
60.	Nindana-VI 29°07'10" N and 76° 25'10" E	Hist, Med.	01.80
61.	Nindana-VII 29°07'20" N and 76° 25'02" E	PGW, Hist	02.40
62.	Seman-I 29°11'10" N and 76° 19'50" E	Ear. Harp, M Harp, LH.	03.00
63.	Seman-II 29°11'15" N and 76° 19'10" E	Med.	02.85
64.	Seman-III 29°11'40" N and 76° 18'05" E	LH (Bedwa-II type).	01.30
65.	Seman-IV 29°11'35" N and 76° 17'50" E	Hist, Med	01.00
66.	Seman-V 29°11'50" N and 76° 16'10" E	LH, PGW, Hist, Med	02.30

	Site and Location	Cultural Sequence Size	(in hectare)
67.	Seman-VI 29°13'50" N and 76° 25'20" E	M Harp, LH (Bedwa-II type).	02.00
68.	Sekhpur Titari 29°05'30" N and 76° 24'20" E	LH, Hist, Med	02.50
79.	Sisar Khas-I 29°01'20" N and 76° 15'10" E	Hist, Med.	02.15
70.	Sisar Khas-II 29°01'15" N and 76° 15'50" E	LH (Bedwa-II type).	01.20

B* = Bhaini

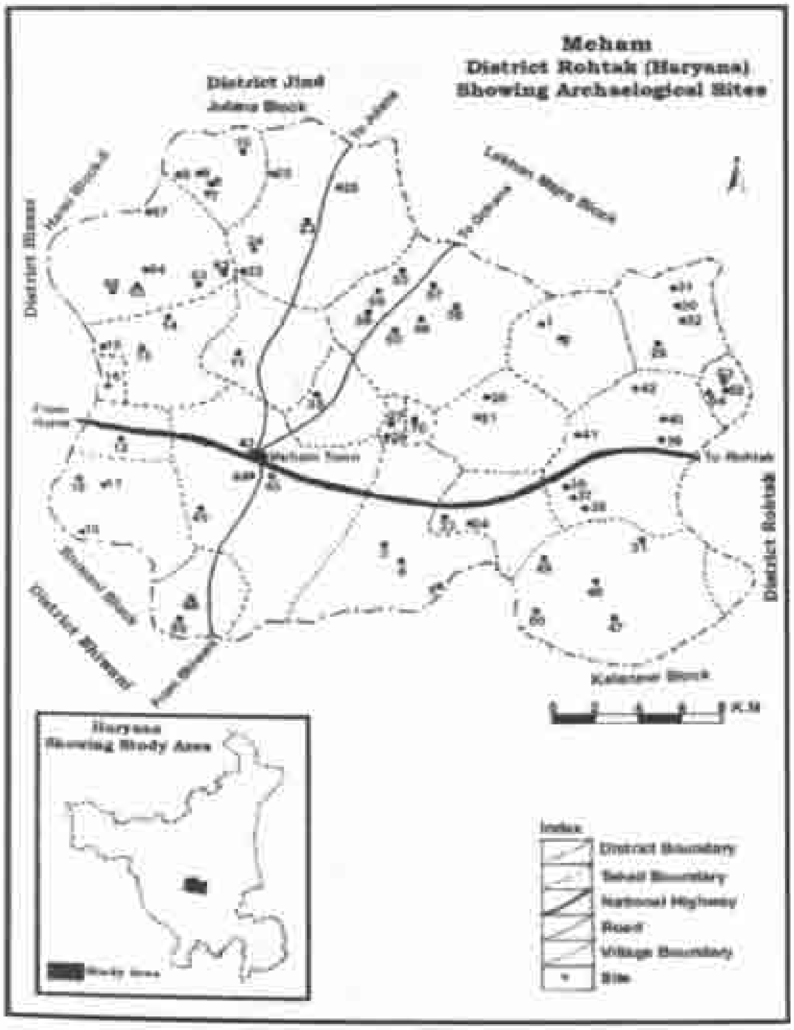

Fig. 1

Discussion

The antiquity of Meham region can be traced back to the proto historic times. Archaeological explorations has revealed that the earliest inhabitants of this region belong to pre Harappan i.e. Hakra Ware Culture, which have been discovered at three sites (Farmana-I, Kheri Meham and Gurawer-II). The pottery collected is similar to the one recovered from Cholisthan region (Mughal 1997:86). The excavation conducted at Kunal (Khatri 1995:84) and Bhirrana (Rao 2004:66) have earlier yielded Hakra Ware remains. The discovery of Hakra ware site in this region has expanded the geographical area of this culture and Gurawer has been identified as the eastern most site of this culture.

Ceramics recovered during exploration are mud appliqué ware, incised ware and black burnished ware. Gurawer-II is under excavation under the direction of V. Shinde and Manmohan Kumar and it has yielded dwelling pits of the Hakra Ware period. Excavation at Kunal (Khatri 1995:84) and Bhirrana (Rao 2004-05:61) has also yielded dwelling pits from the same period. Remains of Early Harappan period were recovered from eight sites i.e. Bahelba-II, Farmana-I, Farmana-III, Gurawar-II, Gurawar-IV, Kheri Meham, Mokhra-III, and Seman-I. All the six fabrics of Kalibanga-I were found during exploration.

Mature Harappan remains were encountered at seven sites: Bedwa-V, Bhaini Surjan-III, Farmana-I, Farmana-III, Gurawer-II, Kheri Meham and Seman-I. Out of these Farmana-I needs special attention. This site is spread over an area of about 18.5 hectare and is the second largest Harappan site in Haryana. The thickness of habitational deposit is about 3 m. At present, the original contours of the mounds have vanished; the western part of the mound has been almost reduced to the ground level. This site has yielded remains ranging from Pre-Harappan i.e. Hakra ware to the PGW period. This site is located about 25 km South-east of Rakhigarhi and 12 km North of Mithathal. The size of the site and material remains point to the fact that it was an urban centre during the Harappan period but Manmohan Kumar considers it to be a semi-urban center and such type of settlements, functionally are 'primary type' (Kumar 2004:26). The pottery recovered from the site and section, shows classic Early Harappan types likes chocolate slipped ware, bichrome ware, black and red ware, and deep incised ware. Thick and sturdy sherds of 'S' shaped jars with geometrical paintings in black, perforated jar, goblets belonging to classical Harappan period are noticed here. Brickbats of brunt bricks as well as some complete baked bricks measuring 40 x 20 x 10 cm. are seen on surface. Some wedges shaped bricks were noticed, which indicates the presence of a well. During the explorations a good number of antiquities were found here, which include beads of agate, carnelian, lapis lazuli, steatite, long barrel shaped t/c, blade and core of chert, a complete spear-head of copper (Pl. 4), terracotta cakes, stone sling balls etc. This site is being excavated under the directions of V. Shinde, Department of Archaeology, Deccan College, Pune and Manmohan Kumar, Department of History, Maharshi Dayanand University, Rohtak (Haryana).

Late Harappan remains were encountered at thirty-one sites. Out of these four are Harappan cemetery sites. Discovery of four Harappan cemeteries in Haryana enrich our knowledge about the funeral process of the Harappans. But these discoveries have raised some questions. The cemetery sites in present study area don't have habitational sites near by except Bhaini Surjan-II. Another feature of these burials is that both habitational and cemetery sites are located on sand dunes some of them having a height of more than 8 m. It was found that four cemetery sites and six habitational sites could be co-related to this type of pottery. At Bedwa-II there was a large cemetery but the owner of the land had destroyed about 100 burials while removing the sand. A good number of graves indicate that the necropolis was in use for more than a century. Pottery recovered from the graves during the process of removing sand is very similar to Late Harappan(Pl. 3). But some features of Early and Mature Harappan were also noticed. Main shapes are vase, long stem dish-on-stand having flaring rims some of them with slightly drooping rims also, some of them were ribbed below junction, bowl-on-stand (Pl. 2), miniature dish-on-stand, some of the specimens have very long stem akin to typical Mature Harappan. Bowls with convex sides and reverted rim, goblets with disc base, vase with under cut rim and ring base, vases with flaring rim and with disc base, *lota* shaped vase with rustication below shoulders, flask with open mouth and flaring rim, 'S' shape jar without painting, big pots with rustication below shoulders, miniature pots and urns are the main pottery types. About 30% of total pottery found during exploration is painted. Pots and vases are decorated with horizontal bands around neck and shoulders (Pl. 1). Some of these have black broadband above shoulder and two horizontal bands near bell. One pot (burial urn) has beautiful peacock painting in black colour recalling the 'Cemetery H' tradition (Fig.2). Almost all pottery has coarse to medium fabric and is pinkish in colour. On the basis of pottery Manmohan Kumar has dated these graves to late phase of the Mature Harappan period and

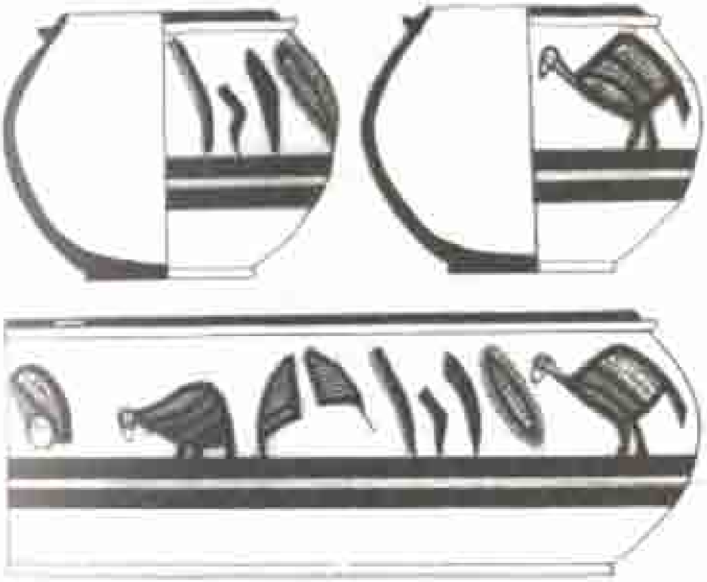

Fig. 2

early phase of Late Harappan period (Kumar 2005: 201). As regards the Sanauli burials, we can conclude that the pottery found is of Bara tradition, which could be dated to Late Harappan times. D.V Sharma has dated Sanauli remains to c. 2200 BC to 1800 BC (Sharma 2005:177), which seems quite probable. Even Bara remains from Sanghol have the same time bracket.

These burials found in the region under the present study are quite different from Sanauli, where a lot of antiquities have been recovered as grave goods. Here in the burials no grave goods were encountered, except for four pots placed near the head of each skeleton. Dish-on stand with drooping rim is also totally absent here. But a burial exposed during removing sand has fragments of a big storage jar below its hips. At Sanauli dish-on-stand has been found placed below hips in some burials and D.V Sharma concluded that it might be and 'offering stand' (Sharma 2005:169). At Bedwa-II were also found evidence of the fractional burials and cremation. An urn containing bones and ash was found here. Another feature of the graves is the orientation of the graves is northwest to southeast. All theses burial sites are located close to each other forming a chain. The average distance between these burials is around 3 km.

There are twenty-four sites related to Painted Grey Ware culture out of which 11 has yielded remains of both Late Harappan culture and PGW Culture. The exact relationship between both these cultures was ascertained after the excavation at Bhagwanpura (Joshi, J.P. 1993). Wheather there was any overlap between the two as found at Bhagwanpura or not can be ascertained only after excavations. Out of these 11 sites Madina-II needs special mention. This site has yielded remains of both these two cultures and is quite big. This site extends to about five hectares and has two-satellite sites (PGW). One is located about 700 m. north of Madina-II and the other one is about 1.5 km. south east of this site. All these sites are quite disturbed but Madina-II has still 50 x 50 m. of area intact, which can be taken up for excavation. During removal of soil by the villagers the present author noticed many furnaces with copper slag. This indicates that the site was an industrial centre and only the excavations can ascertain their chronological position. Pottery of this site is very fine which includes some complete bowls.

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Harappan Weights

The data of Marshall (1934) about Harappan weights shows that they were standardised with an uncertainty of 6%. This fluctuation within each weight class may be a result of weathering and the original weights may well be more accurate. Within this pattern of uncertainty, they follow the octal system for small weights and decimal for larger weights.

There has been a lot of controversy about the standardisation of weights in Harappa. These weights are in the form of cubes of different sizes. While they are considered to be highly standardised, in reality, these weights stagger around the mean value (see e.g. Venkatachalam 2002). In order to estimate the accuracy of measurements, we attempt to quantify the accuracy of Harappan weights.

Data set

In table 1 we have reproduced the weight table from Marshall (1934) as given by Farmer on his website. This list a total of 357 different weights found by Marshall. We applied the following statistical test to the data set to search for the level of standardisation of weights in Harappa. However, before applying the tests we make one correction in the last column of the data. It makes one entry as 9.225. Keeping in view the general ordering of data it seems that the data should read 1.255. However, even if this change is not accepted, it will produce a minor change in the entire results. If this change is not accepted, it would only imply that 1 weight of 9.255 gm existed in Harappa. In the present analysis, it turns out that even the weight of 1.255 is unique. In (Fig. 1) we give a graph of the weights of found in Harappa against the serial number of the weight.

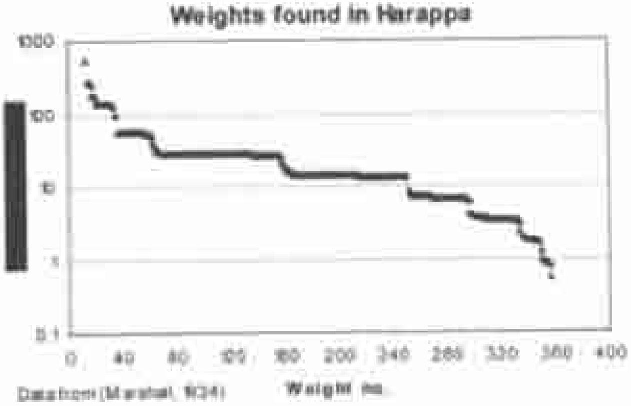

Fig. 1. Distribution of different Harappan weights. Data is from Marshall (1934). The weights are given in gm and the X-axis shows the serial number of the weights after arranging them in descending order of value and plotted in log scale.

We order the entire data set by decreasing order of weight. We then take the ratio of the weight to the previous weight and normalise it to the given weight. If this ratio is different from the earlier one by 10%, we assume that it indicates a new unit of weight. Based on this we divide the above data into 25 different class of weights. The results of our analysis are given in table 2 and figure 2. Column 1 gives the serial number of the class of weight, column 2 gives the number of samples

Table 1: List of different weights from Marshall (1934) Courtesy S. Farmer.

1	2	3	4	5	6
Weight.	Weight.	Weight	Weight.	Weight.	Weight.
11467·6	29·225	27·10	13·697	6·877	3·24
10262	29·00	27·10	13·690	6·87	3·24
6903	28·844	27·10	13·69	6·87	3·12
5556	28·693	27·096	13·680	6·87	3·03
2792	28·64	27·086	13·680	6·862	2·33
2735·8	28·620	27·070	13·677	6·85	2·07
2656	28·470	27·068	13·670	6·84	1·891
2576	28·463	27·06	13·67	6·84	1·86
1446	28·437	27·05	13·67	6·830	1·835
1431·7	28·366	27·05	13·666	6·83	1·815
1375	28·21	27·01	13·660	6·83	1·81
1373	28·083	26·995	13·656	6·824	1·79
546·7	28·020	26·93	13·65	6·82	1·754
275·2	27·85	26·92	13·642	6·82	1·750
274·9	27·825	26·884	13·64	6·817	1·734
264·5	27·75	26·88	13·64	6·802	1·70
256·5	27·749	26·85	13·625	6·80	1·70
185·5	27·68	26·836	13·621	6·791	1·69
174·5	27·667	26·79	13·62	6·79	1·684
151·4	27·575	26·597	13·62	6·781	9·255
137·8	27·527	26·480	13·62	6·78	0·98
136·75	27·515	26·312	13·62	6·779	0·928
136·5	27·50	26·050	13·62	6·774	0·879
136·25	27·498	25·354	13·62	6·77	0·87
136·20	27·496	25·31	13·62	6·769	0·867
136·06	27·462	24·50	13·610	6·76	0·813
135·86	27·45	20·370	13·61	6·76	0·550
135·50	27·440	17·970	13·600	6·73	
135·35	27·437	17·183	13·60	6·66	
135·28	27·43	16·640	13·60	6·65	
134·59	27·40	15·937	13·594	6·600	
133·30	27·40	15·254	13·589	6·31	
129·50	27·352	14·94	13·59	6·305	
123·86	27·35	14·90	13·575	3·96	
96·476	27·35	14·59	13·555	3·93	
56·872	27·336	14·48	13·54	3·90	
55·900	27·333	14·41	13·512	3·780	
55·052	27·33	14·35	13·50	3·604	
54·653	27·326	14·290	13·49	3·556	
54·617	27·30	14·188	13·459	3·554	
54·611	27·30	14·177	13·456	3·520	
54·510	27·295	14·094	13·451	3·51	
54·500	27·293	14·028	13·450	3·49	
54·496	27·29	14·019	13·447	3·484	
54·452	27·28	14·001	13·440	3·48	
54·45	27·276	13·972	13·407	3·465	
54·45	27·25	13·970	13·399	3·44	
54·400	27·26	13·954	13·373	3·44	
54·32	27·229	13·95	13·372	3·44	
54·297	27·227	13·917	13·37	3·43	
54·080	27·23	13·914	13·284	3·43	
54·077	27·22	13·91	13·113	3·424	
54·076	27·21	13·90	13·079	3·422	
54·05	27·203	13·873	8·850	3·416	
53·988	27·200	13·87	7·900	3·414	
54·01	27·177	13·85	7·310	3·405	
53·820	27·174	13·81	7·296	3·394	
53·627	27·164	13·79	7·27	3·39	
52·961	27·150	13·78	6·98	3·39	
52·776	27·15	13·768	6·957	3·381	
49·73	27·139	13·746	6·932	3·38	
47·30	27·120	13·757	6·92	3·362	
40·403	27·12	13·71	6·91	3·343	
33·553	27·117	13·709	6·90	3·329	
31·964	27·113	13·70	6·89	3·313	
30·813	27·103	13·70	6·880	3·30	

Table 2: Mean weights and their ratios

Sr. No.	No. of Samp-les	Mean weight (gm)	Std. Dev. (gm)	% error	Normal	Round	Diff (gm)	Normal	Round	Diff (gm)	From Hemmy. (1938) (g)	Frac. diff. bet. Col 3 and Hemmy
					To 0.55 gm			To 0.89 gm				
1	1	11467.60	-	-	20850.18	20000	-467.60	12892.19	13000	95.90	-	-
2	1	10262.00	-	-	18658.16	19000	188.00	11536.82	11000	-477.50	10970.0	0.069
3	1	6903.00	-	-	12550.91	12500	-28.00	7760.54	8000	213.00	6856.0	0.007
4	1	5556.00	-	-	10101.62	10000	-56.00	6246.21	6250	3.37	5485.0	0.013
5	**4**	**2689.95**	**94.26**	**3.50**	**4890.82**	**5000**	**60.05**	**3024.11**	**3000**	**-21.45**	**2742.4**	**0.019**
6	**4**	**1406.93**	**37.32**	**2.65**	**2558.05**	**2500**	**-31.92**	**1581.70**	**1600**	**16.28**	**1371.2**	**0.025**
7	1	546.70	-	-	994.00	1000	3.30	614.61	600	-13.00	548.48	0.003
8	**4**	**268.28**	**8.20**	**3.06**	**487.77**	**500**	**6.73**	**301.60**	**300**	**-1.42**	**274.24**	**0.022**
9	**2**	**180.00**	**7.78**	**4.32**	**327.27**	**330**	**1.50**	**202.36**	**200**	**-2.10**	**171.40**	**0.048**
10	1	151.40	-	-	275.27	275	-0.15	170.21	170	-0.19	-	-
11	**15**	**134.50**	**3.64**	**2.70**	**244.55**	**250**	**3.00**	**151.21**	**150**	**-1.08**	**137.12**	**0.019**
12	1	96.48	-	-	175.41	175	-0.23	108.46	175	59.19	-	-
13	**27**	**53.92**	**1.77**	**3.29**	**98.05**	**100**	**1.08**	**60.62**	**60**	**-0.55**	**54.848**	**0.017**
14	1	40.40	-	-	73.46	75	0.85	45.42	75	26.31	-	-
15	**89**	**27.48**	**1.11**	**4.03**	**49.96**	**50**	**0.02**	**30.89**	**32**	**0.99**	**27.424**	**0.002**
16	1	20.37	-	-	37.04	37	-0.02	22.90	25	1.87	-	-
17	**92**	**13.89**	**0.76**	**5.45**	**25.26**	**25**	**-0.14**	**15.62**	**16**	**0.34**	**13.712**	**0.013**
18	1	8.85	-	-	16.09	16	-0.05	9.95	10	0.04	-	-
19	**45**	**6.85**	**0.24**	**3.51**	**12.46**	**12**	**-0.25**	**7.70**	**8**	**0.26**	**6.856**	**0.001**
20	**31**	**3.45**	**0.19**	**5.59**	**6.28**	**6**	**-0.15**	**3.88**	**4**	**0.11**	**3.428**	**0.006**
21	1	2.33	-	-	4.24	4	-0.13	2.62	2.5	-0.11	2.285	0.019
22	**14**	**1.79**	**0.10**	**5.79**	**3.26**	**3**	**-0.14**	**2.01**	**2**	**-0.01**	**1.714**	**0.042**
23	1	1.26	-	-	2.28	2	-0.16	1.41	1.5	0.08	-	-
24	**8**	**0.89**	**0.06**	**6.46**	**1.62**	**1.5**	**-0.06**	**1.00**	**1**	**0.00**	**0.857**	**0.037**
25	1	0.55	-	-	1.00	1	0.00	0.62	0.5	-0.11	-	-

in that class of weights. Column 3 gives the mean weight in the class while column 4 gives the standard deviation in the weight (when the sample size is more than 1). Column 5 gives the percentage deviations (standard deviation by mean ' 100). As can be seen from the data, the fluctuation within a single weight class is less than 5% for all the weight classes except the three classes with the lowest weight where it goes up to 6%. Columns 6 to 8 give these values normalised to the smallest weight of 0.55 gm. Within this data, column 6 gives the ratio of the given weight to 0.55 gm, column 7 gives the nearest round off number and column 8 gives the fractional difference in weight from the mean. In most cases the difference is less than 1s of the mean value. Since only 1 weight of 0.55 gm is found, column 9 to 11 give the same values for normalisation to the weight of 0.89 gm. The rows with weights where more than 1 piece is found are given in bold.

We have compared the results of Hemmy (1938) in the last two columns. As can be seen from the table, the two measurements of weights independently by Hemmy

(1938) and Marshall (1934) are in agreement. Marshall (1934) consists of 357 weights while Hemmy (1938) consists of 331 weights.

Figure 2 gives the plot for all the weights normalised to 0.89 gm (Column 10) plotted in log scale against the mean weight. As can be seen from the figure, for higher weights, the weight of neighbouring units falls more steeply than for lower weights. This is consistent with the commonly held view that the higher weights follow decimal system while the lower weights follow octal system. This can also be seen in the data in table 2 where the number of samples is more than 1.

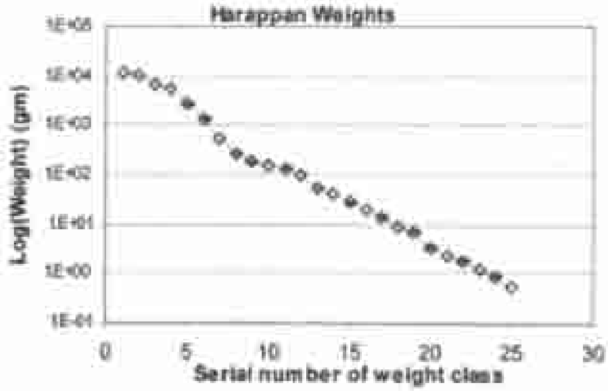

Fig. 2: Distribution of weight (in gm) of different weight units of Harappa. As can be seen from the figure, the spacing between consecutive weights is steep in the weights of 1000 kg class while it is much more gradual for lower weights of 100 gm or less. Lines with – are the ones with more than 1 weight in that unit.

Conclusion

The Harappan weights are highly standardised with less than 6 percent fluctuation within each weight class. A certain part of this fluctuation itself may have been a result of erosion and the original weights may have been even more standardised. The weights also seem to follow a fixed ratio from the minimum value. The commonly found weights seem to be in the ratio, 3000: 1600: 300: 200: 150: 60: 32: 16: 8: 4: 2: 1. The base is 0.89 gm as the lowest weight, which is the smallest amongst the commonly found weights. This clearly agrees with the generally given ratios for Indus weights. As can be seen from table 2, the error between the round off number and the average of the weights of that class is less than the standard deviation with in the class and amounts to about 6% error in the manufacture of the weights and may indicate the limits to Harappan technology. It seems that the binary weights may have been used for trading in small quantities of precious materials while decimal weights may have been used of larger objects.

An earlier study by Hemmy (1938) came to similar conclusions. Mainkar (1984), working on this data of Hemmy (1938) came to a similar conclusion. However, using subsequent excavated data of Rao (1973) from Lothal, Mainkar (1984) suggests that the weights in Lothal are similar to the weight units defined in Arthashastra. However, Venkatachalam (2002) suggest that this weight division may more akin to the ancient Tamil weights.

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A Note on Sothi Pottery

The Harappan pottery is identified as homogenous assemblage of ceramics spread across north-western Indian sub-continent in 3rd millennia B.C. Within this homogenous set of earthenware, considerable variations are notable in different groups of ceramic assemblages in different regions of Harappan domain bound with common characteristic features. In India, A. Ghosh was the first to notice this regional divergence, "In the explored Drishadvati valley also there are a few sites…with unmistakable Harappa affinities, but there are a few differentiate in pottery fabric and types. They may be regarded as the eastern variety of the Harappa culture, and it is not unlikely that they flourished at a period later than the true Harappa. This phase of the culture requires further investigation" (Ghosh 1987:101).

Following explorations of Ghosh in 1951-52, the Archaeological Survey of India carried out excavations at Kalibangan for nine field seasons (1960-1969). The early Harappan pottery designated as Sothi assemblage by Ghosh, was recovered for the first time in the stratigraphical context. B.K. Thapar elaborately studied this pottery and classified it into six *fabrics* - A, B, C, D, E and F (IAR-1962-3: 20-3). According to Thapar Fabric A is dull red ware having red to pink colour in section and black paintings on surface; most importantly, pottery made on slow wheels having irregular striation marks. Fabric B is red slipped pottery rusticated up to shoulder with clayey solution mixed with sand having black horizontal bands on the slipped portion. Fabric C is again red slipped pottery with fine and smooth textured surface in shades of red and plum or purple- red colour with carefully executed paintings in black colour. Fabric D is pottery with thick sturdy section and red slipped surface. The main distinguishing feature of fabric D is incised designs on the interior as well external surface. The shapes of this fabric are also peculiar- heavy jars, basins and troughs. Fabric E comprised vessels with buff or reddish buff slip painted in black and sometimes in white pigment. Fabric F consist of grey pottery painted in both, black and white.

This classification still remains basis of description of early Harappan ceramic assemblage reported in explorations and excavations; often referred as *six fabrics of Kalibangan*. The present article explores possibilities of a more reasonable classification of the Early Harappan ceramic assemblage. Here, an attempt is made to re-define 'Early Harappan ceramics' with the help of pottery from the type site Sothi, recovered in the excavations by A. Ghosh in 1952-3, now stored in Central Antiquity Collection of ASI in Purana Quila, New Delhi.

Sothi

L.P. Tessitori discovered the ancient site of Sothi; later it was visited by Aurel Stein (1942), Ghosh (1950-53), Dikshit (1979), K.F. Dalal (1980). It is located in the plain of the ancient river Drishadvati at a distance of about 10 km. southwest of Nohar, a railway station. It is a low mound merging with the surrounding sandy land, except for some swells in the middle with potsherds spread on surface in an area of about 200x200 sq. meters. A. Ghosh laid six trial trenches at Sothi numbered as STH-A to STH-F. The STH-A was on the top of the mound, while STH-B on the slope. The occupational deposits of about 60 cm and 30 cm were encountered at STH-A and STH-B respectively. K.N. Dikshit re-examined Sothi and noticed an accumulation of 3.40 m on the western side of the mound. From the upper levels Harappan pottery mixed with Sothi ware was found whereas the lower level yielded only Sothi ware. The mature Harappan phase was confined to upper 0.50 m. deposit which has yielded triangular and round terracotta cakes, balls pierced in the middle with four divisions, cart-frames and bangles (Dikshit 1984:531-537). The present author has noticed that layer 1 is the topmost layer mixed with Rangmahal pottery at Sothi. The pits in layer 2 also show intrusion of Rangmahal pottery in Early Harappan layers.

The Early Harappan pottery from Sothi is classified now, essentially on the basis of *ware*, which denotes colour of core material (red, buff and grey); a secondary criterion remains surface treatment and third is presence of shapes in a particular ware. All three wares- red, buff and grey with their subtypes including verities with incisions, monochrome and bichrome paintings (in another words- all six fabrics of Kalibangan are present) are noticed at Sothi. The sherds taken into consideration are drawn and described as follows-

Description of Pottery (Fig. 1 and Fig. 2)

1. Fragment of a small vase with straight everted rim, medium to coarse fabric, 2. Upper portion of a small pot with externally projecting rim and short neck well fired medium fabric, 3. Upper portion of a small sized globular pot with slightly externally projected rim and well-fired medium fabric, 4. Upper portion of a red ware medium size bowl with out-turned beaded rim and slight carination on shoulder, 5. Fragment of ledged base of a dish with medium to fine fabric, 6. Fragment of a small vase with short featureless rim with almost straight neck applied with chocolate slip on the exterior medium fabric, 7. Fragment of a medium sized vase with out turned rim with concave neck and globular body with medium fabric applied with tan/chocolate slip on neck and body portion, 8. Fragment of a vase with out turned rim, thin section of black slip on neck and body portion, irregular striation marks on interior, 9. Incised red ware with horizontal parallel lines and diamond pattern, 10. Incised red ware with horizontal alternative sets of straight and wavy parallel lines, 11. Buff ware with incised horizontal parallel lines, 12. Red ware with horizontal V pattern incisions, 13. Red ware with horizontal intersecting V pattern incisions, 14. Incised red ware with horizontal V motif with multiple lines, 15. Incised red ware with criss-cross pattern, 16. Self slipped red ware with black paintings interconnected parallelograms with criss-cross pattern, 17. Red slipped ware with floral motif painted in black, 18. Red Slipped sherd with horizontal parallel lines and a single wavy line painted in black, 19. Intersecting loops painted in black on rim portion of a red slipped bowl, 20. Buff ware with horizontal lines painted in black, 21. Red slipped pot with thick horizontal parallel bands and loops painted in black, 22. Red slipped sherd with alternative thick bands of painting in black and white colours respectively, 23. Red slipped ware with alternative V shaped bands in white and black pigment, 24. Red slipped jar of small size with thick horizontal black band on neck and thin horizontal black band with wavy lines sandwiching a white painted band. Thus on the basis of the above description, Sothi Pottery is classified as shown in Fig.3.

However, the idea of classifying Sothi pottery into traditional ware is not new. Earlier, J.S. Nigam had already proposed revised classification of 'Sothi pottery

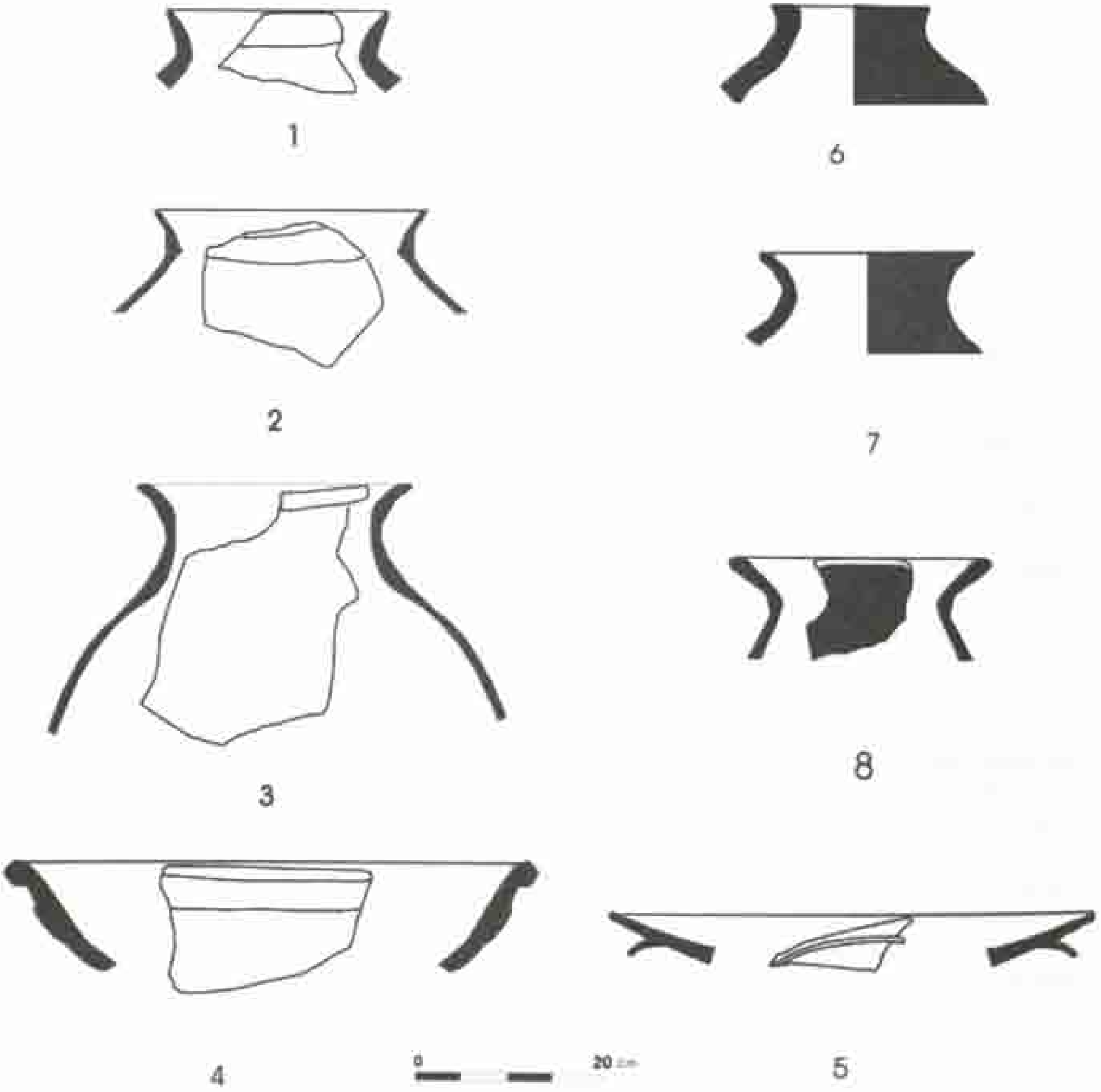

Fig. 1: Sherds of Red Ware, Sothi, Hanumangarh, Rajasthan

from Kalibangan' in the traditional category of the *wares*. He reclassified the ceramic assemblage of the early Harappan levels of Kalibangan broadly into three major wares *viz.* red, buff and grey (Nigam 1996:7-14). He included Thapar's Fabrics B, C and D in the category of the red ware. In each of the wares classified by Nigam, pottery technically shares the mode of manufacturing, decorations and some popular shapes. The red ware included bowl with vertical, internally bevelled, everted out turned or out –curved, thickened rims and convex or tapering profiles, with ring pedestal base, and vases of various size with out-turned and out-curved rims. The paintings are in black and in bichrome. The shapes in buff ware were limited to chalice and a few vases. The paintings are rendered in black, occasionally using white pigment also. The grey ware consists of bowls with vertical rim and vases with flaring mouth. Though painted pottery is rare still some examples can be seen with white along with black paint (Nigam 1996:7-14, Fig 3, 7).

Further, in one of the most important contributions on the subject, while writing a chapter on pottery for *Excavations at Kalibangan: The Early Harappans* Madhu Bala finds Nigam's classification 'thought provoking' but retains Thapar's classification "which is more elaborate for obvious reasons and has been so far accepted" (Madhu Bala 2003: 101). Besides six fabrics she has also added Hakra, Impressed and Reserve Slip wares as separate wares.

Stipulation of Re-classification

The ceramic assemblage found in any archaeological context is classified on the basis of certain criteria-functional aspect (storage jar), surface morphology (surface treatment and paintings etc.), shape morphology, fabric composition and sometimes technique of manufacturing. 'Fabric' is a general term used in archaeological literature to refer the clay composition, denoting composition of particular ceramic being fine or course in terms of use of material and firing condition. 'Fine fabric' is generally pure clay as raw material without any additions and firing at high temperature. 'Course fabric' is taken as pottery with additional material like sand, grass etc. besides clay. Sometimes, ill or moderately fired pottery is also referred as course pottery.

It appears that term 'fabric' has been used alternative for the general meaning of 'ceramic ware' by Thapar while classifying pottery of Early Harappan Kalibangan. As rightly pointed out by Dales, "The manner in which this early pottery is classified is, however, puzzling. It is said to be characterized by six "fabrics", labelled for convenience as Fabric A to F (Thapar 1965:20). No definition of what "Fabric" means here is found in the preliminary reports. From the descriptions of each, it seems that the term is a general rubric for a group of pottery having similar paste, colour and surface decoration, but this is not absolutely consistent. What is certain here is that the vessel *form* has no part in definition "Fabric" and hence a fabric grouping at Kalibangan can include the entire range of vessels and forms. Conversely, a distinct vessel form can be included in more than one fabric grouping. As presented in the preliminary reports, this is an unsatisfactory approach to pottery classification" (Dales and Kenoyer 1986:8). Hence, certainly term "Fabric" is not very suitable to indicate various pottery types based on either surface or shape morphology. Use of term "Fabric" in context of pottery studies should be restricted to indicate composition only.

Another important observation was regarding distinguishing features of Sothi pottery in relation to Kalibangan ceramics. Though Kalibangan pottery is often described as 'Sothi pottery reported in stratigraphic context for the first time', many of the characteristic features of Kalibangan pottery are not present in Sothi pottery. The former has more variety as compared to the latter in terms of technique of

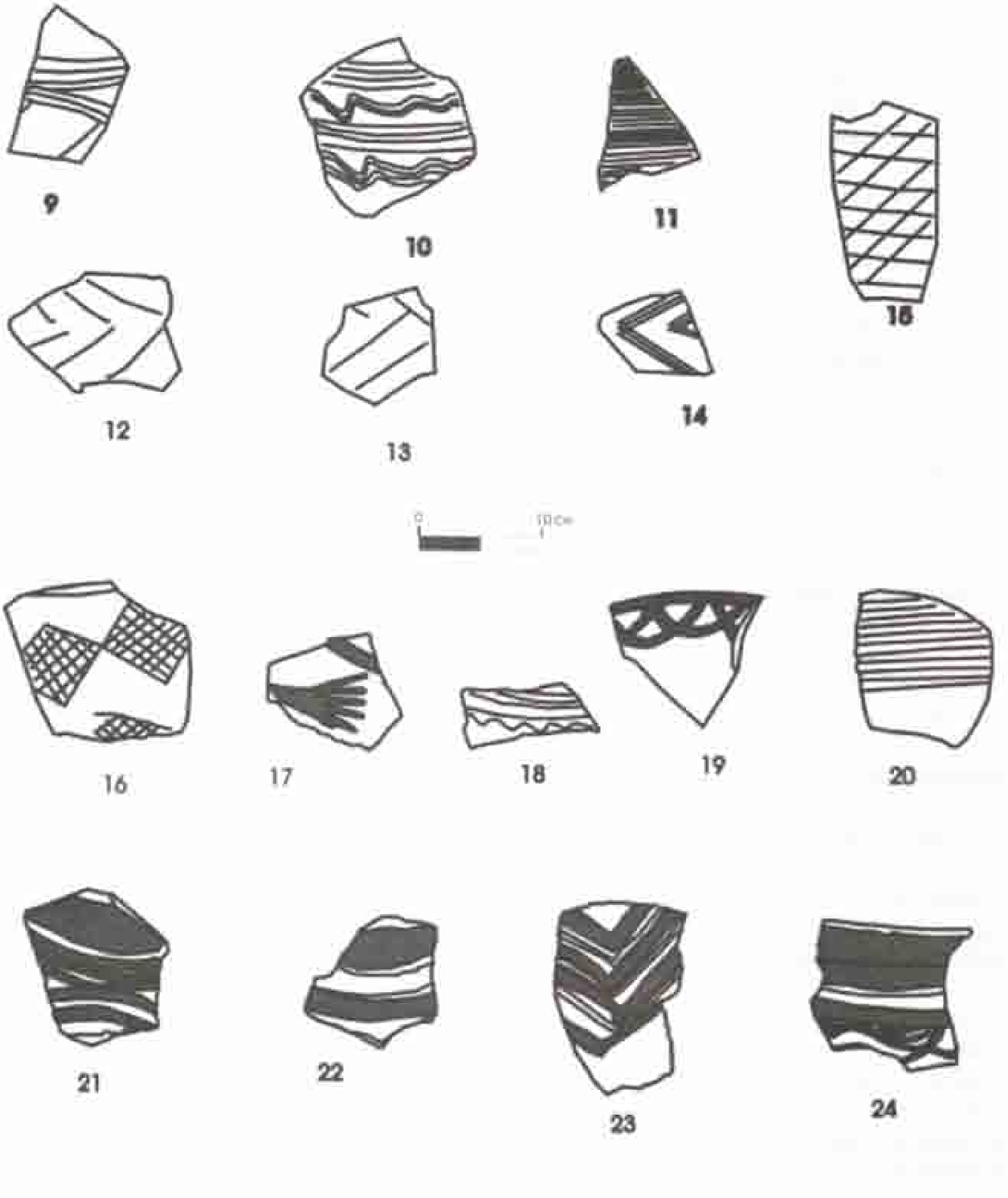

Fig. 2: Incised and Painted sherds, Sothi, Hanumangarh, Rajasthan

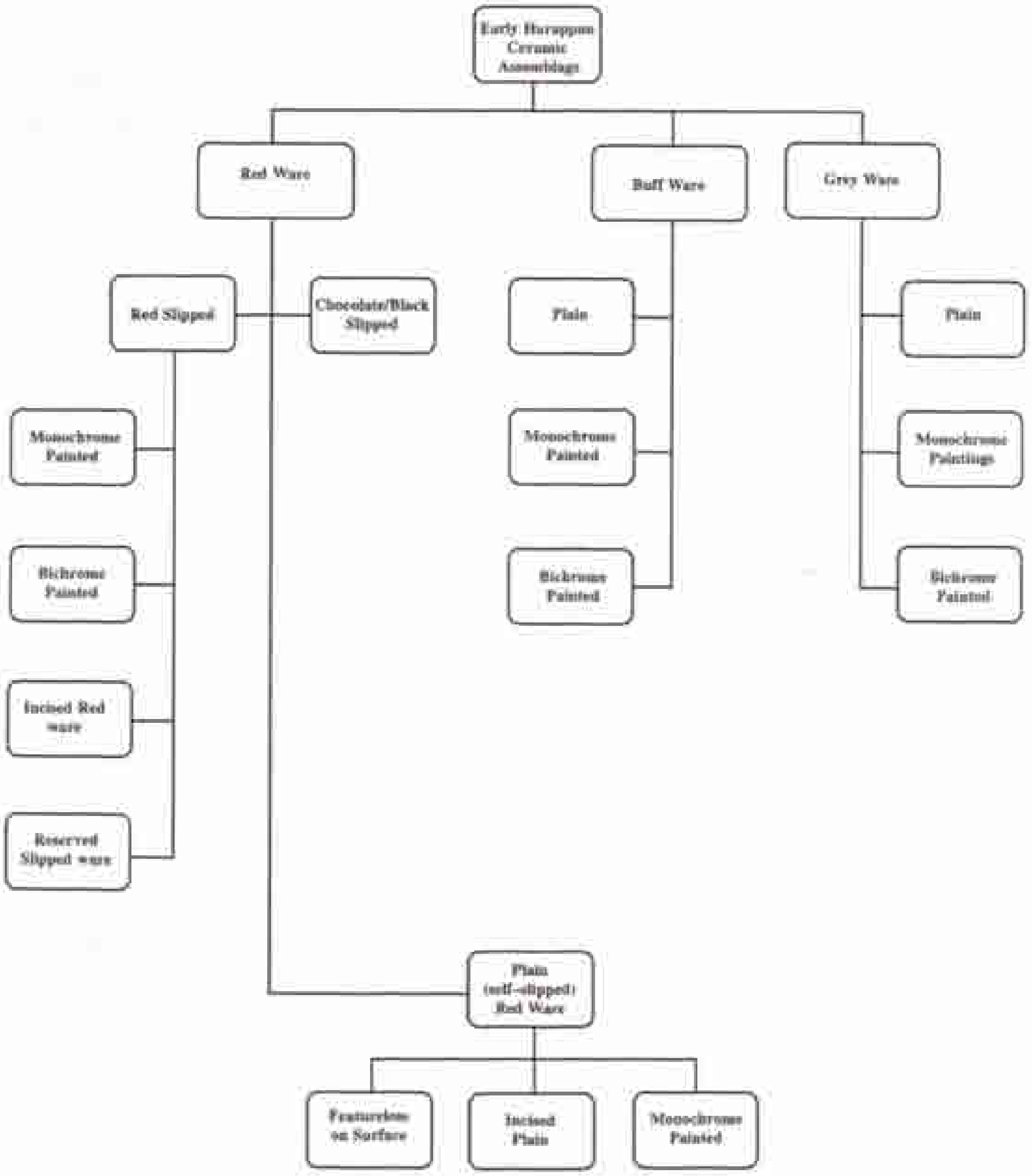

Fig. 3: Proposed Classification of Sothi Pottery

manufacturing, shapes and surface treatment. The main designs at Sothi include black bands, horizontal lines, zigzag horizontal or vertical lines, curvy lines, converging oblique strokes, suspended loops, fish scales, crossed hatched diamonds, apposed triangles, arcading designs, arrow, etc. Very few plant motifs (Fig.2, 17) are noticed on Sothi pottery. Plant motifs present at Kalibanagan pottery such as petalled floral designs, corn plant, *peepal* leaf, sun flower, cactus and creepers (Madhu Bala 2003: 101-222) are absent at

Proposed Stage	Pottery	Sites	Tentative Chronological Bracket
Stage 1	Pottery with three basic wares, namely red, buff and grey with incisions, monochrome and bichrome paintings with limited designs, more percentage of handmade and slow wheel pottery	Lowermost levels of Bhirrana, Rakhigarhi and Sothi	**6000 (?)-4600-3800 B.E.C.**
Stage 2	Continuity of the wares present in earlier level, with higher percentage of slow wheel pottery	Siswal A, Middle and Upper layers of Sothi	**3800-3200 B.E.C.**
Stage 3	Evolved variety of same wares with higher percentage of fast wheel and better textured pottery with more variety of painted designs and shapes	Kalibangan-I, Period I (b) at Rakhigarhi and Bhirrana	**3200-2800 B.C.E**

Sothi pottery. Various faunal motifs depicted on Kalibanagan pottery are totally missing on Sothi pottery. Some other motifs which typically characterize Kalibangan pottery- moustache like- bifold design and *trishula* like motifs are evidently absent at Sothi. Similar observations were made by Suraj Bhan while comparing pottery from Siswal with Kalibangan Early Harappan ceramics (Bhan 1975:104).

The presence of so called six fabrics or same wares at Kalibangan and Sothi lead to categorize them as one and the same entity. Certainly, Kalibangan ceramic industry is characterized by more evolved types, verity in shapes and designs, refined fabric (composition of clay/raw material used for manufacturing) the sturdy nature and better plotting. In comparison to this, Sothi pottery remains less evolved in terms of shapes, motifs and designs, surface treatment, composition of fabric and technique of manufacturing. Hand made and slow wheel turned pottery is notable in Sothi whereas in Kalibangan fast wheel pottery dominate along with few varieties of hand moulded and table turned pottery.

Thus, it can be safely concluded on the basis of the discussion above that the Kalibangan ceramic industry was a logical development from the Sothi pottery. This phenomenon also leads to proposition of three stages within the Early Harappan cultural period as shown above.

This proposition has to be tested on more number of excavated sites. Further research can throw more light on the ceramics and evolution of the early Harappan culture in the Ghaggar- Yamuna divide.

Acknowledgements

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Tejas Garge

Keshavpur – A Unique OCP Site of Aligarh District

In the international seminar on Ochre Coloured Ware (OCP) culture at New Delhi, M. N. Deshpande remarked about the origin, maturity of this culture and its development in time and space. (Deshpande 1971-72: 26-27). Consequently, during recent years OCP culture has started attracting the attention of many scholars. With a view to collect more data about this culture, the present authors started exploring OCP site in Aligarh district and discovered several sites. Among these Chandaukha and Keshavpur were investigated thoroughly. The report about the site of Chandaukha and others have been published earlier (Ramjit and Abid 2000-2001). The site Keshavpur (27 48' N lat. 78°07 E long) is noteworthy and significant because of certain features not found elsewhere. It is located about 13 km. southeast from the district headquarter. In the revenue record the site is mentioned by the name of Keshavpur-Gadrana. Gadrana is a village in the east of the mound.

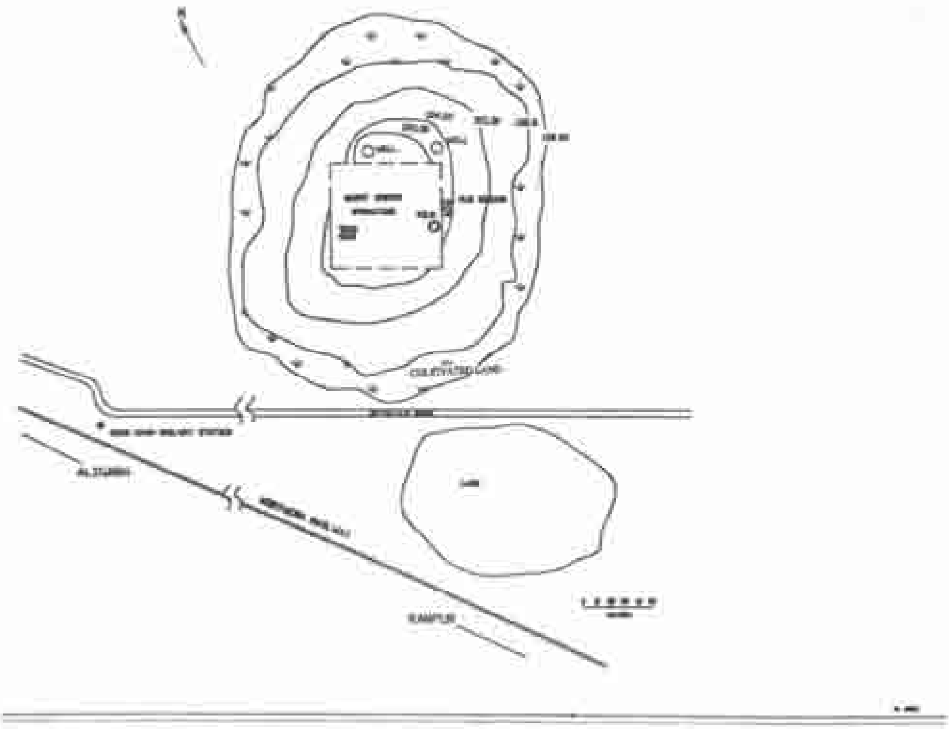

Fig. 1: Keshavpur, Contour cum site plan

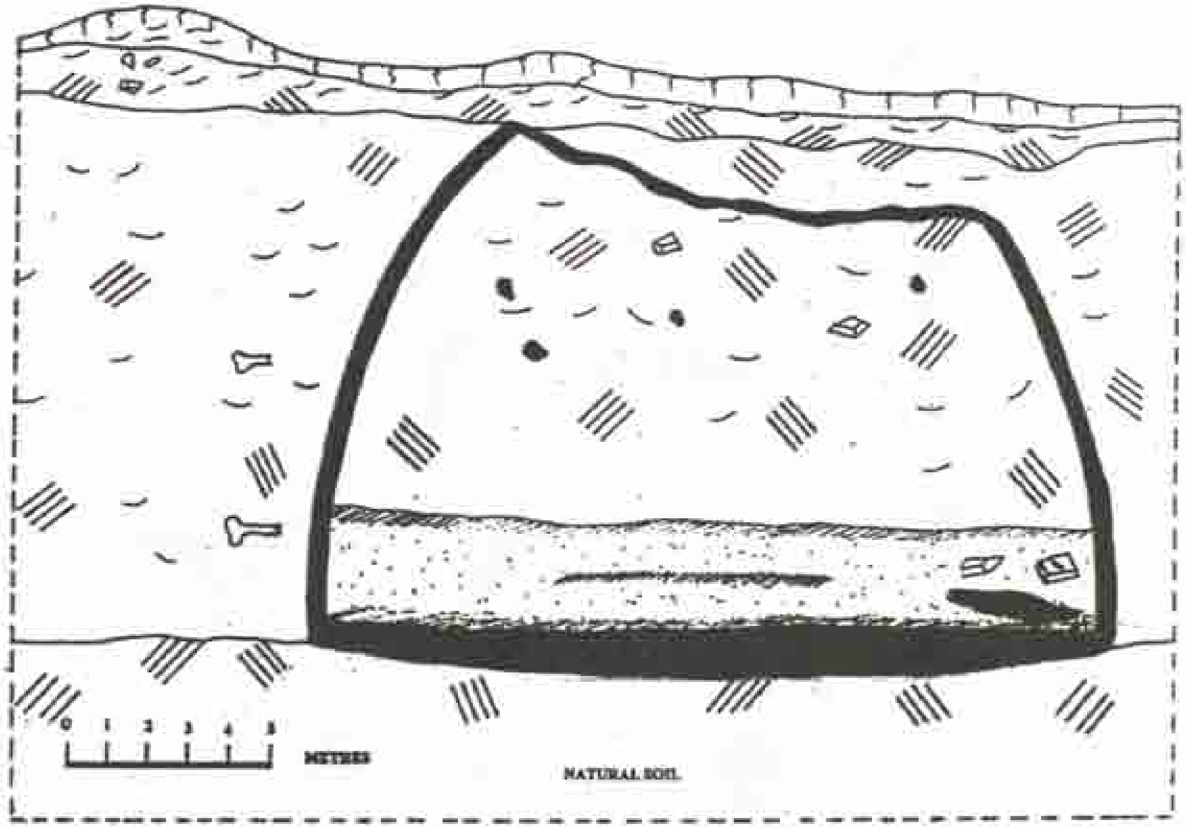

Fig. 2: Kehsavpur. Brick kiln - section looking South East

The site can be approached by metalled road. The river Sengar connects Chandaukha and Keshavpur, the present bed of which lies about 2 km. In the east of the latter site the excavated sites of Lal Qila (Gaur 1995) and Atranjikhera (Gaur 1983) are situated in the adjoining districts of Bulandshahar and Etah respectively.

This site was discovered by the present author in 1991-92 during the exploration of Aligarh and was assisted by Bhoor Mohammad, Department of History, A. M. U., Aligarh. The potential of the site then, was not determined because of huge crops capping over the entire mound. Later on, the site was revisited and was found badly disturbed by large scale digging operations, leaving the exposed section in the north, south and south- east of the site. The remaining terraces have been found occupied by the agricultural fields.

The area of the site measures 270x170 m, which is elliptical in shape and the height varies 1 m to 2.60m from the present ground level. In the contour plan, the disturbed area is demarcated with the dotted lines (Fig.1). Close to the ancient settlement, in the south east, is as patch of low lying shallow land measuring 150x150m. Perhaps it was lake which is also under cultivation now. Most probably it was dug to raise the habitational platforms and it could have also been used as a source of water. The site is divided into three sectors. Southern sector of the mound appears to be the richest part of the settlement. It is not only because of the presence of many pottery fragments including different

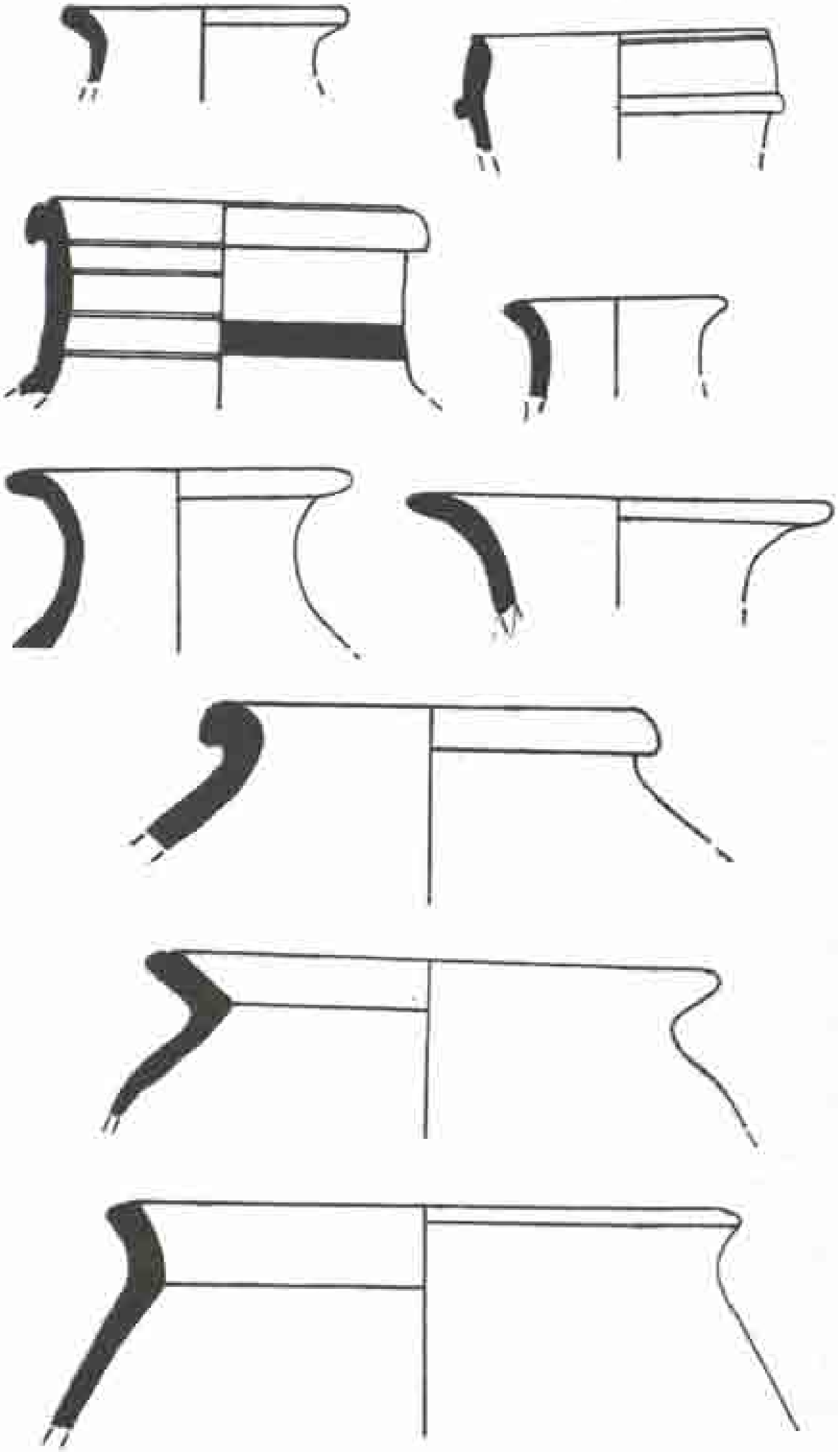

Fig. 3: Kehsavpur, vases & vessels

shapes, decorated incised wares and painted designs but also remains of structural activity were noticed here. Northern sector of the site seems to have been subsequently disturbed. No habitational remains were found here. Inspite of the fact that few sherds were found in the matrix of natural soil, just like at other excavated sites in Gangetic doab similar deposits were also found at Chandaukha, Ogar and Sankra on Budhiganga in Aligarh. On the Western sector too, almost similar disturbance was found with most significant evidence of burnt-brick platform 'altar', lying partly exposed.

Geomorphologically the land elevation is formed by Ganga and its tributaries. Gradual depression in southeast is probably because of the old bed of the Sengar River. The soil is loamy, mixed with clay and fine grade of yellow sand of dark brownish colour. It is supposed to be most fertile for food crops. Wheat, barley, gram, mustard, maize, bajra, and jwar are staple food crops presently grown in this region. Apart from these cattle rearing is main occupation of the people. Gypsum, salt, saltpeter, carbonate sodas are the mineral products. It is a salt affected belt as indicated by sensor's imagery.

Structural Remains

As indicated in the contour plan, the major part of the settlement has been disturbed upto the natural soil by means of soil diggings. A careful investigations and scrapings of the exposed section at various places, revealed that actual habitational deposit was between 1 m to 1.70 m. Burnt-brick structures are very few and rare from OCP levels. A hearth and brick-kiln was found from Ambkheri (Deshpande and Dikshit 1971-72 and 1963-64). Chandaukha in district Aligarh appears to be another site to have yielded intact water well, internally lined with wedge shaped finger grooved bricks measuring 30x24-19x6cm. From the corresponding OCP levels (Ramjit and Abid 2001). The present site Keshavpur also yielded the remains of a brick-kiln and two burnt brick platforms from similar deposit (Fig.2). Such an evidence of this kind is unique one.

Burnt brick platform (Pl.1)

On the western sector of the mound, 1.5 m thick deposit was detected. At lower level few bricks and its fragments were noticed lying over the ground partly exposed by the mud diggers. Therefore, it was minutely investigated. In this area below the depth of 1.2 m, a heap of debris along with bones was observed. After removing the debris a solid brick structure with its two courses, was identified. It was found in a circular fashion. To record the details further, first course of bricks were removed. After discussion with Prof. Sahi I have come to the conclusion that it would be better to identify it as a 'Sacrificial altar'. Charred bones around the altar are suggestive of performance of sacrifice. Alignment of bricks indicated a circular plan of the structure. Unless the bones are identified, it would be difficult to say about the species of the animal. But it was certainly a big animal as the size of the bones suggests. There is no paucity of references in the literary works beginning with the Rigveda. On the same level another evidence of a similar brick 'altar' adjacent to the earlier one was detected where few bone pieces along with the bricks were noticed again. Due to our apprehension that this evidence may not be available to us in our next visit at the site- we decided to scrape the structure to know its nature completely. Deposit at the bottom of bricks was hard and of brownish clay; probably it may have been a mud platform over which several burnt bricks were found lying in unusual form. Some of them were found vertically laid in the ground while others in a slanting position resting over one another while some other bricks were laid over the floor paved with mud mortar. Above the floor of the platform considerable numbers of charred bones were found. Perhaps it was another 'altar like' the other one described earlier. Some charred grains were also collected from the same spot.

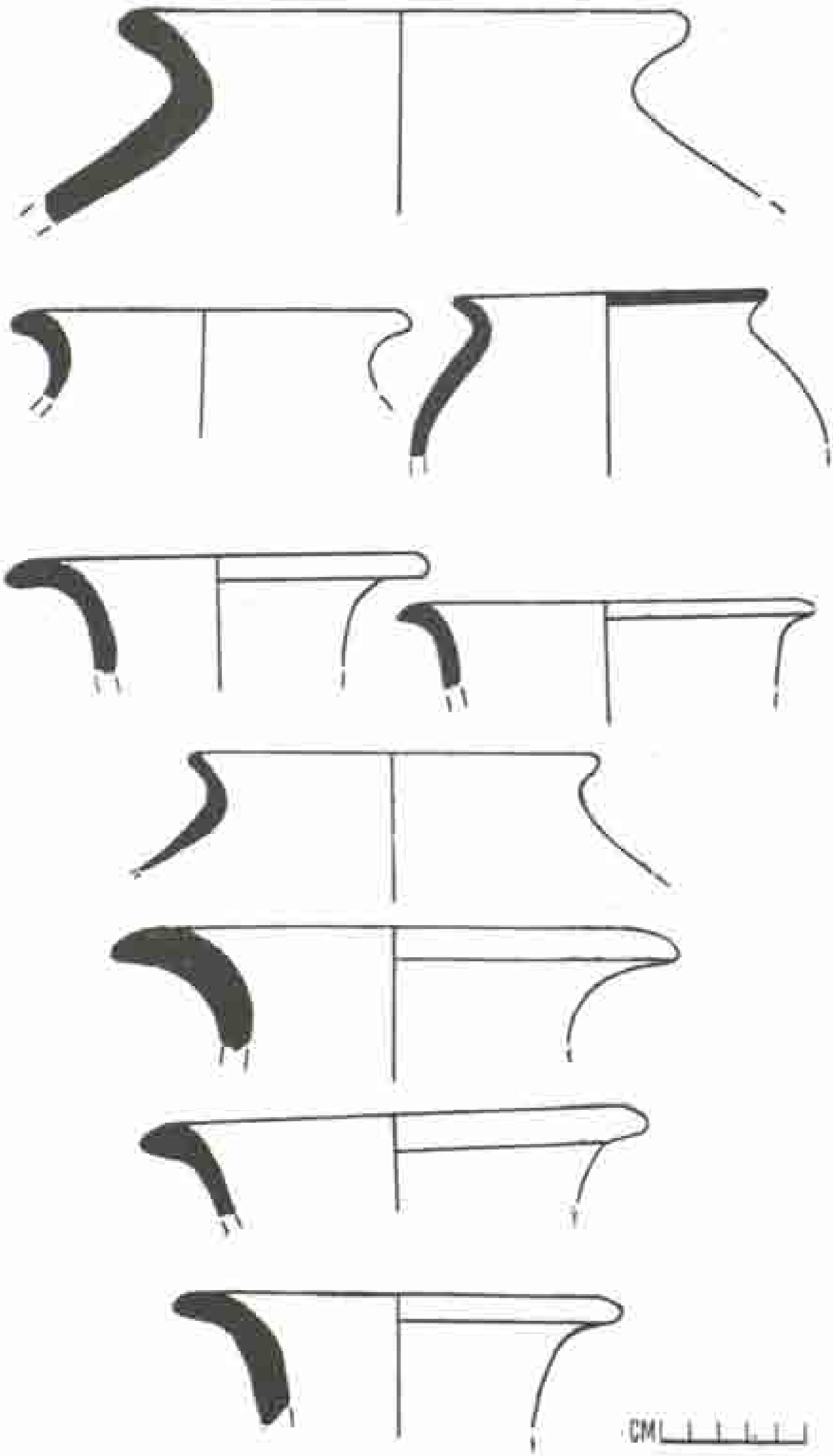

Fig. 4: Kehsavpur, Vases & Vessels

Brick kiln (Pl. 2 a & b)

Kiln or furnace has been reported since pre-historic period. Evidence of earliest pottery-kiln comes from Mohenjodaro as well as from Harappa (Vats 1974). Mackay gives illustrated description of it. Technical aspects of kiln and process of uniform baking of pottery (Hegde1977: 109-111) suggest that Harappan pottery is baked in vertical up draught kiln whereas ordinary pottery of daily life were baked through open firing method. Such evidence has come from Basra also in Sutlej valley. From western doab Ambkheri, Hulas (Dikshit 1981) are the sites to have yielded the remains of kiln but these were found small in size. There is no other evidence of Kiln from OCP levels which however, is considered to be a distinctive earliest cultural horizon of the Ganga valley. Probably Keshavpur is the first site to have yielded the evidence of brick kiln though in a disturbed condition from the corresponding OCP horizon. However, its shape etc. could reconstruct accurately. In our subsequent visit, except a small portion, the rest of it was found damaged by the earth diggers. On the eastern sector of the mound its intact portion was detected and thoroughly examined upto the ground levels. Similar to the kiln found at Kotla Nihang (Sharma 1976: 12), its base was found partly underground in the natural soil. It was found almost circular in plan having its wall plastered and well burnt from inside and outside, indicating continuous firing activity.

The average thickness of burnt plaster measures 8 to 12 cm. It was completely filled with dark brownish, creamish and whitish ash. A large number of brick fragments including some complete one were recovered from kiln. Pottery, which was found from the kiln, was well baked and sturdier than those found from surface, but the quantity was small. It was cleaned stepwise till its bottom but revealed no material accept burnt ash and brick fragment. A well-burnt brick of size 23x23-18x8 cm along with burnt structure black patch of structure was found on the bottom at one corner in the kiln. Occurrence of single piece of crucible from here indicated some other kind of activity, may be, smelting, was done here.

A thick deposition of loose ash and frequency brick fragments gives clear-cut indication of its being a brick kiln. Actual height and diameter of the bottom of kiln is not known because it was mostly damaged. However, as per our finding its minimum height and diameter of bottom was 1.7 m and diameter 4.5 m. respectively Other technical features of kiln such as aperture, vents, fire chamber could not be determined but its dome appears to have been in a conical shape. This evidence of kiln is extremely noteworthy because such evidence is rare in the Gangetic valley.

Pottery Complex (Fig. 3-7; Pl. 3 a & b)

Southeastern sector being rich settlement area of the mound yielded maximum number and variety of pottery. An assemblage of pottery indicated a developed ceramic industry at this site. Generally it is of thick fabric made of well levigated clay. It is wheel made and kiln-baked sturdy red ware. However, colour as well as slip varies. Difference shades of slip such as smooth red, brownish red and creamy red slip are applied on the pottery. Like Chandaukha, thickness of pottery also vary from 2 cm to 2 mm. Majority of the pottery is wheel made but common pottery of domestic use, specially water vessels are hand made. Besides this, additionally mud coated ware and finger pressed appliqué/grooved ware are special features of this site. A thick paste of mud mixed with rice husk was applied on external surface of pot. Some sherds bear comb-pattern incised designs. Such pottery is considered to be earlier and have been reported from Kot Diji, Amri Pd I A, datable to the middle of 4th millennium BC. It is also important that a base fragment of jar of burnished Black and Red Ware was found from the deposit in disturbed area of the mound near the brick platform. Other types included burnished ware and some

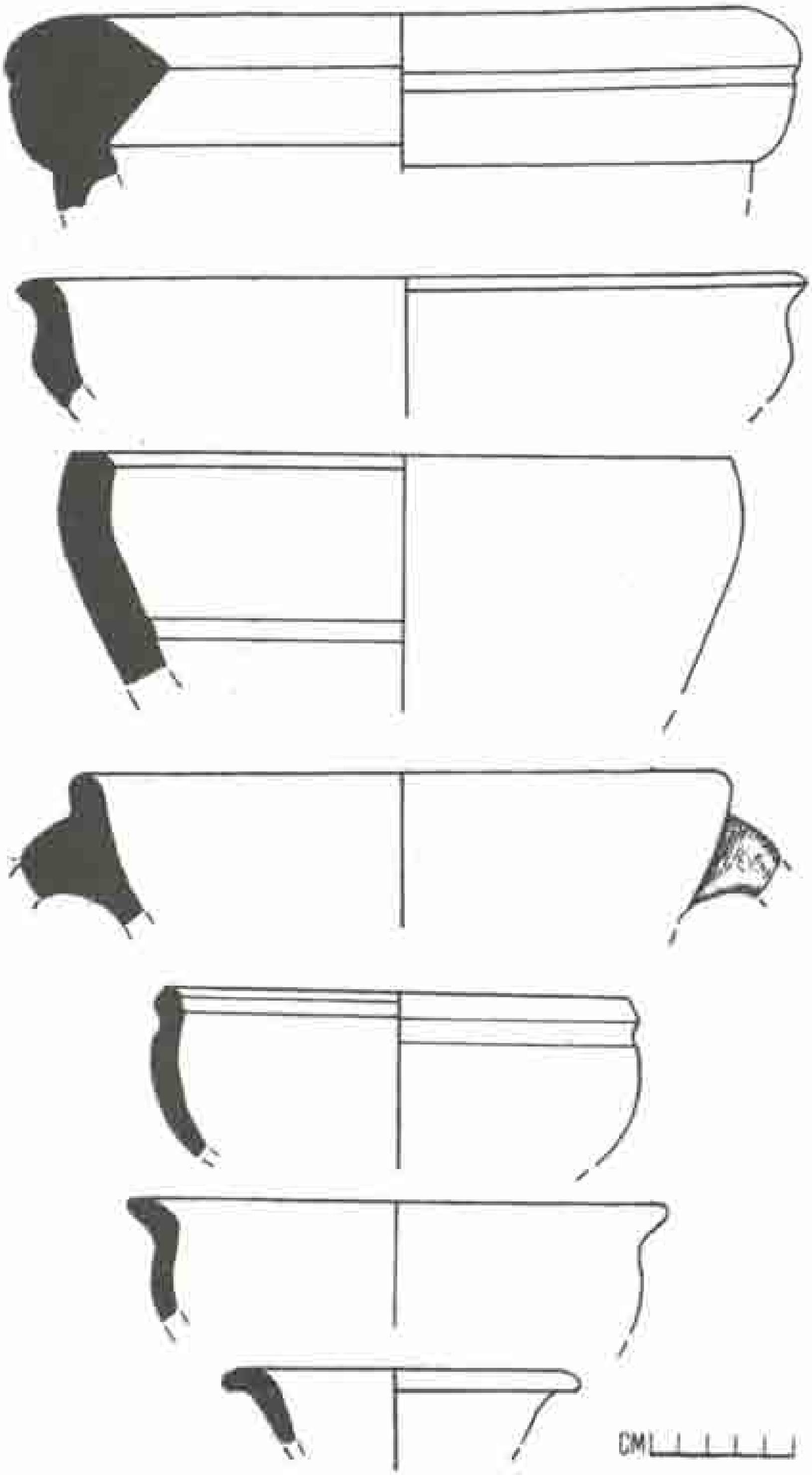

Fig. 5: Kehsavpur, Basins & bowls

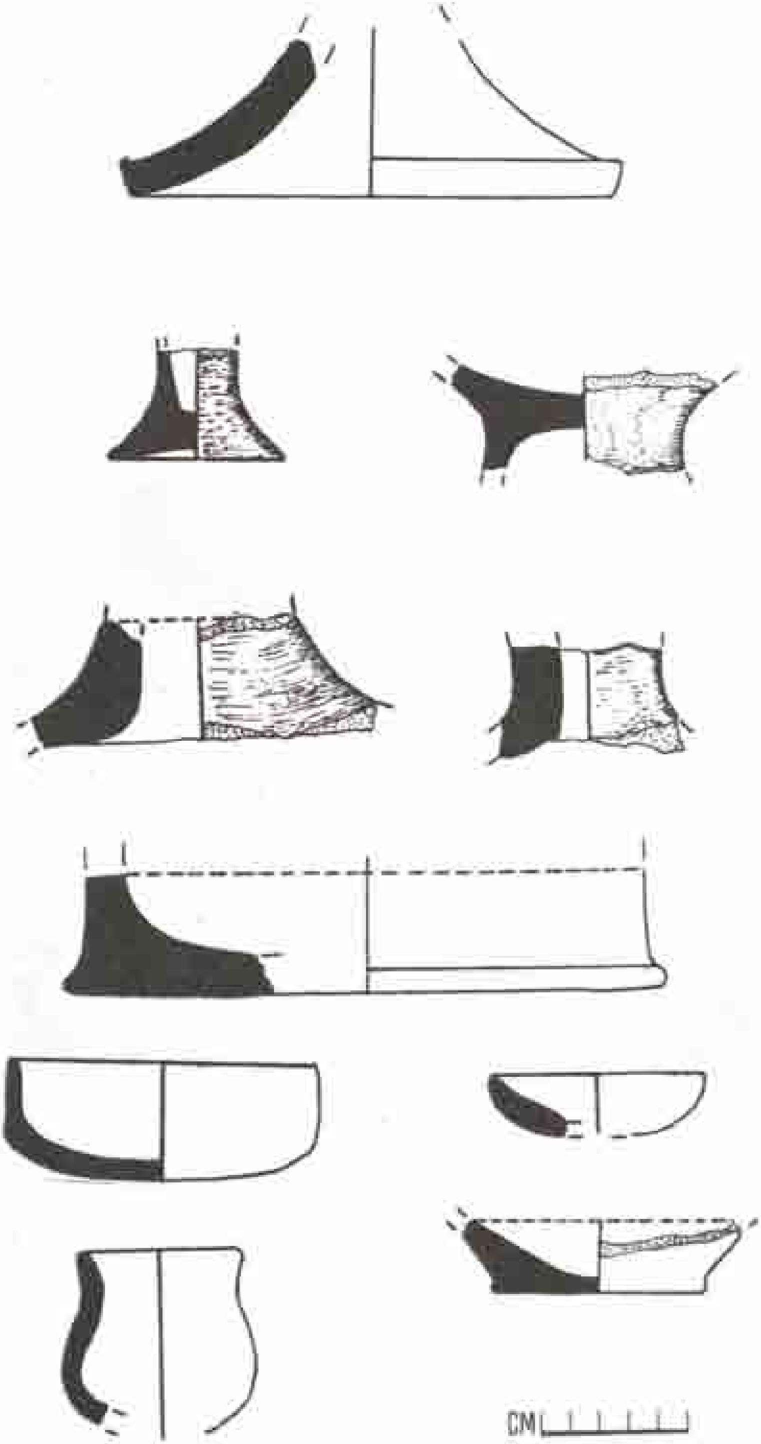

Fig. 6: Kehsavpur, Bases, dishes on stand

bear graffiti marks. A large number of pottery bears painted designs, which includes thick bands, thin parallel bands, oblique parallel band and loops etc. Among shapes, vases, bowls, dish-on-stand, lids, spout and vessels and handled pots are noteworthy (Pl. 4). Total pottery complex was comparable with Chandaukha, Jodhpura phase Ic, Atranjikhera period I and Lal Qila. Lal Qila ware consists elaborated painted design and appears to be later.

Material Culture

Among antiquities mention may be made of a terracotta wheel bearing graffiti marks, bangle pieces, pendant, ear ornament, hind part of an animal beside a small piece of copper and a nodule of green jasper. Considering characteristics of the entire ceramic industry from Keshavpur, including its painted designs, incised decorative patterns and graffiti marks the site appears to represent the early infant Harappan period mentioned by Sahi (2002).

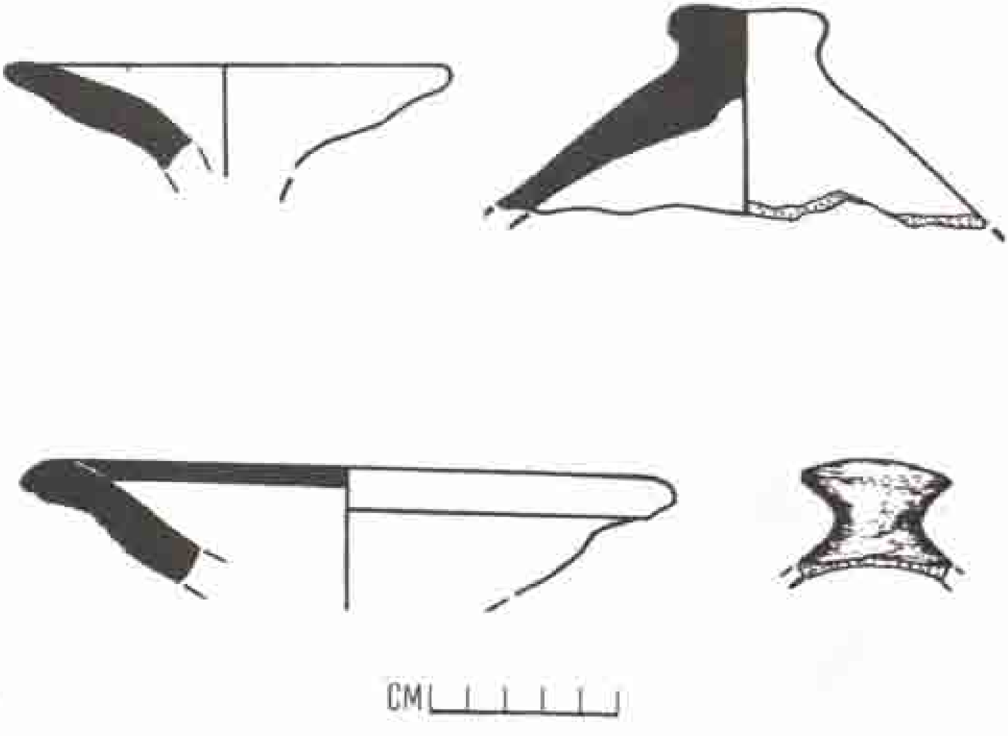

Fig. 7: Kehsavpur, Lids

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A Unique Terracotta Bull Unearthed from Andipatti Excavation-Tamil Nadu

The village Andipatti, (Latitude 12° 13' E and Longitude 78°44'N), an important historical site datable to 3rd century BCE onwards, is situated 15 km from Chengam in Chengam Taluk of Thiruvannamalai district in Tamil Nadu. Andipatti village is approachable by road from Chengam and is bordered on the northern and western side by the inner Javadi hills. Ponnaiyar reserve forest and Ravandavadi reserve forest are located in the southern side of the village.

Physiographically, Andippatti village is a raised mound and is sloping eastward with a few perennial dry tanks in the close vicinity. However the western side is covered by hilly terrain. The Sattanur reservoir is located about 6 km from here. The metamorphic crystalline rocks of Archaean Age belonging to Charnockite group are a major rock formation found in Tiruvanamalai taluk. Charnockite group of rocks comprises Charnockite, Pyroxene-granulite, Meta-norite, and metamorphosed basic dykes and sills.

The Tamil Nadu State department of Archaeology carried out excavations at ancient capitals of the Chera (Karur), Chola (Kaveripumpattinam), Pandya (Korkai), Pallava (Pallavamedu), Later Chola (Palayarai), (Gangaikondacholapuram) dynasties. The department also excavated the capital of the chieftains like Malayaman (who ruled Tirukkoilur), in the first half millennium CE, Kadavaraya, (Sendamangalam), Sambuvarayas (Padaivedu) chieftains of medieval period. Hence, it was proposed to carry out excavation at Andipatti, which was an ancient capital city of Nannan who ruled this region in the Sangam age (300 BCE to 300 CE). Malaipadukadam, one among the anthologies of Sangam period, composed by Perugausiganr, praises Nannan, the chieftain who ruled over the valley of Seyaru. It also describes the mountain scenery, the description of the hills that belonged to Nannan, which is longer than the lines devoted to his eulogy (Iyengar 1983: 548). In the year 1967, 143 lead coins with Tamil Brahmi script belonging to the 2nd century CE were found at Andipatti. The inscription on the coins mentions the name of the king as Athinan Ethiran Chendan (Kasinatha 1993: 44). Presently these coins are in possession of Government Museum, Chennai. The Tamil Nadu State department of Archaeology also noticed 45 hero stone inscriptions in and around Chengam and published the book entitled Chengam Nadukarkal. The earliest hero stone inscription belongs to 6th CE of Simhavishnu of Pallava dynasty found at Narasinghanallur, near Andipatti.

The excavation was carried out at two habitation mounds locally known as Nattamedu and Sambalkadu and twelve trenches were laid bare. Two stratigraphical layers with average depth of 1.50 meters were noticed. The site yielded potsherds of Iron Age (Megalithic) and historic period *i.e.* black and red ware potsherds and coarse red ware sherds. Two cultural periods are demarcated from the unearthed antiquities.

Period-I: Confined primarily to Layer 4 & 3 (1 BCE to 5 CE) are characterised by the yield of inscribed potsherds, graffiti potsherds and grooved tiles. **Period- II**: The archaeological debris from Layer 1 and 2 (6th CE to 12th CE) is characterised by the presence of spindle whorls, hopscoch, shell bangle pieces and terracotta figurines.

Terracotta Bull

In India the antiquity of clay figurines goes back to Neolithic and Chalcolithic periods. The clay figurines reflect the characteristic features of each period with regional distinctions both in style and type (Gupta 1972: 1). The earliest terracotta animal figurines found on the subcontinent are from the Chalcolithic sites of settled agricultural communities of Kulli, Quetta and Zhob (Ghosh 1989: 338-339) where bull was commonly found with raised humps and short legs.

The exact utility of the animal figurines is not known but those with socket for incising axis of wheel might have been used as toys. Some figurines of the ram and bull could have been used as votive offerings or cult objects. In the Peninsular India, Neolithic sites such as Piyampalli, Sanganakallu, Tekkalakotta have yielded crudely made animal figurines. The Iron Age sites in Tamil Nadu such as Kunnathur, Sanur, Adichanallur, Amirthamangalam also have yielded animal figurines. In the excavation at early historic and medieval sites of Tamil Nadu a large number of terracotta animal and human figurines were collected. Most of the animal figurines consist of bull, horse, buffalo and ram.

The excavation at Andipatti revealed some unique artefacts. One such finding was the terracotta humped bull. A unique terracotta humped bull of this kind has been found for the first time in South India. It was found in the trench APT 3 (Sridhar 2005:17-18) at the depth of 80 cm. The height of the bull is 35 cm and length is 28 cm. The leg portion of the bull is similar to the legs of the sarcophagus that occurred in the first layer of **period I** datable to 100 CE. The other associated antiquities found in the same layer of period I are coarse variety of black and red potsherds and coarse red ware potsherds. The bull is portrayed in standing posture with raised hump. A bell adorns the neck below, which resembles the present day bell tied around the neck of the domesticated animals in the villages. The right side horn is slightly upturned and depicted like a crescent. Both the left side horn and ear are broken. The eyes are predominately shown open. The skin in the neck portion is shown interlaced. The mouth is shown slightly open. An interesting part of the bull is the belly portion. It resembles a round shaped pot without lip. An opening is also noticed below the belly.

Observation about the Terracotta Bull

Agriculture and domestication of animal was the main occupation of the Neolithic and Iron Age inhabitants. Hence the animals that they used for house hold purposes were the centre of attraction for their votive and rituals. The bull is worshipped as *Nandi* the mount of Lord Siva. It was also associated with lord of death, Yama and considered as his mount. The terracotta figurines found both in the exploration and excavation, though do not possess any artistic merit as that of medieval Chola period sculptures, but have their own merit depicting the artistic spirit of local artisans. In every village of Tamil Nadu, one can see terracotta images of bull installed in the village temples for the welfare of their cattle wealth of the village. This bull from Andipatti excavation might have been used as votive object or cult worship. It can also be assumed that it might have been used for storing ash of dead ones in the Iron Age or early historic period (i.e. 100 BCE to 100 CE).

The other remarkable find includes inscribed potsherds, graffiti potsherds, and terracotta figurines of mother goddesses and another head portion of a bull.

The inscribed potsherds with Brahmi inscriptions read as: 1. **Atta**, 2. **Kuma** and 3. **Inga na ir cha na**. The discovery of spindle whorls and iron objects proves the fact that this site once existed as a flourishing centre for weaving and iron smelting industries. The other antiquities include, semiprecious stone beads, terracotta beads, shell bangle pieces, terracotta ear lobes, grooved tiles, terracotta pipes for smelting of iron ore, hopscoch, iron objects such as knife and nails, copper objects, terracotta figurines and pottery such as black and red ware, red slipped ware and coarse red ware.

From the recovered antiquities, the strategic position of Andipatti on Chengam highway connecting Dharmapuri and South Tamil Nadu is proved from the excavation. The yielding of inscribed potsherds with Brahmi script and grooved tiles are testimony to Sangam habitation at Andipatti. From the material evidences it can be inferred that the Sangam age and Iron Age (Megalithic Age) of Tamil Nadu are contemporary. Thus the excavation focuses on the material aspects of civilized culture.

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S.Vasanthi

Sample Preparation for Archaeometric Studies: Analysis of Medieval Glazed Bricks from West Bengal

This article is an outcome of the first-ever successful archaeometric analysis of glazed architectural ceramics in India. It documents the methods of sample preparations for analytical techniques employed to understand the technology of glazed bricks and tiles from Gaur and Pandua, the capital cities of medieval Bengal.

Medieval archaeology in India has focused mostly on correlation between archaeology and text, technical studies of architecture and on some prominent settlement sites. Analytical studies have received comparatively less importance. It is partly due to the fact that analytical studies, especially those involving advanced archaeometric methods, have found few friends in the general historical approach that remains still today the dominating paradigm of medieval studies in India. This is not a result of animosity but a lack of dialogue between practitioners of archaeometry, historians and archaeologists. The present article attempts to initiate this dialogue.

Previous Research

Application of glazed bricks and tiles in the construction of elite and religious buildings is a phenomenon occurring almost exclusively in the medieval period in the various regions of the Indian sub-continent. Sultanate Bengal witnessed appearance of polychrome glazed architectural ceramics in 15th century AD. However, the technology of manufacturing the glazed architectural ceramics is still to be fully understood. Most of the studies on glazed bricks in India, and particularly those in Bengal, have so far been directed towards the morphological and stylistic considerations and the associated textual evidence (Chatterjee 1994; Hassan 1995; Mohammad 1985); while the objective has been to document the available evidence and to trace the provenance of the said technology, either to China or to Persia.

Problems and objectives

Keeping in mind the lacunae in the earlier approaches in understanding the technology of glazed architectural ceramics in the medieval Bengal, the initial objective of the study of these bricks was to understand the chemical composition and the firing techniques employed in the production of these glazes.

There exists a huge corpus of literature relating to the archaeometric studies of ceramics as well as glaze, glass and enamelling technologies on the international level. Unfortunately, such studies are limited in number as far as the south Asian archaeology is concerned. Although the archaeometric analyses of glaze technology have been employed in the Indian archaeology since the time of the excavations at Mohenjo-daro, majority of such studies have analysed glaze/ faience or glass materials of protohistoric times and rarely of early historical/ historical times (Sana Ullah1931; Lal 1952; McCarthy and Vandiver 1990; Gogte and Kshirsagar 1991; Bhan *et al.* 2002, etc).

There has been only one example of archaeochemical analysis of medieval glazed wares (Agrawal *et al.* 87) in India, where glazed bowls from Fatehpur Sikri, a principal City of Mughal Empire, were analysed through Microscopic analysis, Atomic Absorption Spectroscopy (AAS), Quartz Emission Spectrography (QES) and X-Ray Diffraction (XRD) Analysis. This study is important since it has more or less correctly assessed the thickness as well as the mineralogical composition of the applied glaze on the pots through the petrographic studies based on optical microscopy and through X-ray crystallographic studies. However, there are certain problematic areas in the analysis. The results lack clarity as regards the analysis of chemical composition of glaze. It measures SiO_2 content of the glaze, apparently, by gravimetric, chemical analysis, whereas the percentage composition of the other metal oxide constituents of the glaze – including alkali oxide glaze modifiers and the transition metal oxide colourants – are determined through QES, and yet all these data regarding the composition of the glaze, obtained through various methods, have been reported in a single table. The inference about the possible use of bronze pieces as the possible source of copper and tin in the glaze samples is also questionable and has not been properly substantiated. Moreover, the article does not mention method and the logic of sample preparation or how the glaze was extracted. To avoid such shortcomings in our study of polychrome glazed bricks of Gaur and Pandua, it was decided to document meticulously the analytical procedures and their preparations as a first step towards attempting to evolve a benchmark for methodology of glaze analysis.

Nature and procurement of archaeological artefacts required for analysis

These tiles and bricks are of overglaze bichrome or polychrome variety, with white, dark blue, greenish blue, green, yellow and ochre brown colours. In many of the samples coloured designs are painted over a white / off white base.

There was a systematic extensive survey and documentation of Gaur ruins carried out by the Directorate of Archaeology and Museums, Government of West Bengal in 1990's (Mitra 2002; Sinha 2002). The samples required for our analyses were procured from the materials collected through this survey, as well as from the personal collections

Bricks of white, deep blue, bluish green, greenish blue, yellow (both deep and light), ochre brown and green were studied in the present work.

Preparing Samples

We began our studies on bricks and glaze separately. The first and foremost objective of any archaeometric analysis of ceramic products/ glaze technology is to understand the chemical and mineralogical components, manufacturing process and technological know-how involved in the production of the said artefacts. It was necessary to know whether the bricks had been single or double fired, chemical composition of glaze, nature of brick body, and chemical composition of brick body. For understanding firing temperature thermal analysis including DTA (Differential Thermal Analysis) was conducted. In this method both straight heating to high temperature as well as graded heating at 50° C was conducted. Glaze was analysed for chemical and mineralogical composition. For the first analysis we have used Atomic Absorption Spectroscopy (AAS) and X- Ray Fluorescence (XRF). For understanding the mineralogical composition X- Ray Diffraction (XRD) was employed.

The analyses undertaken so far required careful sample preparation as it would otherwise affect the final results, as indicated by Cox and Pollard (1977) in their discussion about the sample preparation of ancient glass for XRF analysis. The physical condition of the object under investigation is of paramount importance, viz. whether it is clean or encrusted with decay products, whether surface enrichment or depletion of certain elements has occurred depending partially on its exposure and post-depositional factors. All these factors caution us against uncritical acceptance of analytical results where all the procedures leading towards analysis are not properly documented.

The following sections describe in detail the procedures involved in the sample preparations of both the brick body as well as glaze.

Sample preparation for DTA and XRD analysis

Since the DTA involved visual examination of changes in the brick cores and glaze surfaces in the intervals between the graded heating, samples needed to be in the small slices/ blocks from the bricks representing the area from core to surface (3×3×1 inches). The bricks collected for making samples were to be sheared in slices. Shearing was done in lathe machine by clamping the bricks in steel vices and applying high speed, rotating circular discs made of high temper steel blades or abrasion diamond blades.

XRD analysis also used these brick slices.

Sample Preparation for AAS Analysis:

Atomic Absorption Analysis required glaze in a powdered form since the sample is used in the final analysis in a soluble form. Powdering was done by abrasion of glazed surface of brick samples against a carborundum (Silicon Carbide) or Alundum (Alumunium Carbide) head fixed to the chuck of an electrically operated Gun drill.

The gun drill was fixed to a vice and small brick slices were moved about rotating abrasion head. Abrasion head rotates and peels of powdered glazes from glazed surfaces of brick samples. Rotation per minute (RPM) of the gun drill used was around 500-600. (Rotation per minute of gun drills defers from one place to the other. It was our observation is that low RPM drill is more suitable for removing hard thin glaze layers.) Glaze powder was collected in a dry and clean polythene sack. After that it was transferred to a polythene sample bag. This was then transferred to air tight polythene sample bags and tagged with a reference number.

The main problem in this stage of sample preparation was the extremely thin layer of glaze applied on brick body. To overcome this problem more than one brick were used for extracting powdered sample of a single colour. This is possible because most of the colours analyzed in the study so far have been profusely used. Hence it was possible to get hold of several pieces of bricks on which same colours had been applied.

Sample Preparation for XRF Analysis:

AAS did produce preliminary data, both qualitative as well quantitative, about the glaze components. However, it was necessary to subject these samples to XRF analysis as AAS does not detect silica component in the sample. Moreover XRF also offers data on trace components. For AAS, 0.5 -1 gm of sample is required in a powdered form, whereas for XRF, 5 -10 gm of sample is needed. Since it was not possible to extract this amount from the glazed brick sample, it was decided to prepare glaze-chips as samples.Chips were sheared off from glazed surfaces of bricks by holding them against high speed circular blades. On an average one brick can produce 3-4 workable chips. Chips were then mounted on perpex blocks, measuring around 1" x 1" x ¼", with the help of epoxy resin. Perpex, being a non-silica containing polymer and epoxy resin being organic polymer adhesive did not interfere with the XRF analysis of inorganic oxides constituting the glaze and its colourants. The other advantage being these mounted chips could also be further used for SEM-EDAX analysis.

Brick body was also subjected to the XRF analysis. The samples for XRF analysis, carried out in collaborations with the Department of Geophysics, IIT, Khargapur, were in the form of small pellets of very finely powdered brick cores.

Conclusion

In most of the writings concerning analysis of archaeological materials, sample preparations are not given enough importance. However, it was felt during the analysis of these glazed polychrome bricks that documenting these preliminary procedures would not only make the results more scrutinable, but would also help in evolving a standard methodology for such archaeometric analyses in the South Asian context. The result of the analysis is being published in a forthcoming volume on medieval Gaur.

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Endnote

While this article was being written the first author Somnath Ghosh passed away on January 5th 2007. His intellect and interests in archaeometry made this project possible.

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A Reappraisal of Rare Spoked Wheels from Harappa (Pakistan) and Ganeshwar (India)

After a detailed study of terracotta toy wheel models with spokes from Bhirrana and other Harappan sites in India, the present author in his concluding remarks had observed that most of such wheels are reported from sites located within the Saraswati–Ghaggar-Hakra and Drishadvati valleys and also from Gujarat region. Simultaneously, a total absence of similar wheels from the Indus valley proper was also noted (Rao: p.66). However the author had also drawn attention to an unnoticed terracotta toy wheel model with spokes in relief from Chanhu–Daro (Kenoyer 1998: 228, cat. No.161) which forms part of a terracotta ram mounted on wheels.

Now for the first time we have an excellent specimen of a terracotta toy wheel model with painted spokes from Harappa. A photograph of the same is published by Vats in his monumental excavation report of Harappa (Fig. 1). He has described it thus:

"No 34 (687) is almost wheel shaped with a prominent hub. It is coated with white glaze on which are painted eleven equidistant bands of purplish black colour. The hole through the hub is irregular. Its lower edge has been rubbed. Ht.65 in., Mound F; Trench I, Square M 12/6; Depth 10 ft. b. s., stratum IV." (Vats 1940 vol. I: 314-15 and vol. II, pl. LXXXII, 34)

Since Vats has placed the above described object in the pedestal category, he further says, "The above pedestals are likely to have been used to support vases with pointed or rounded bases…"

Although the object is placed in the category of pedestals yet the candid description implies that Vats had recognised the true nature of it. The "eleven equidistant bands" do represent spoke which radiate from the central hub of the wheel. The entire description of the wheel including the irregular axle –hole perfectly tallies with those of terracotta toy wheel models with painted spokes from Bhirrana (Rao 2005-06:61,pl.2 and Fig.1). It may be observed that out of the four objects identified as pedestals only No.34 alone resembles a spoked wheel whereas the remaining objects are different in their shape and do not bear spokes. Even Vats is not certain, rather speculates, about their "likely" functional utility as pedestals.

At this juncture it is also of interest to note that painted terracotta toy wheel models of solid variety from Harappa have been reported (Vats1940:45; Wheeler1947:129, pl.L.B3). It was for the first time, a painted terracotta toy wheel model from Chanhu-daro was identified as a true representative specimen showing the manufacturing technique of the then existing real wooden wheel of solid variety (Mackay 1943:162-63). Subsequently three more varieties of terracotta wheel models of solid variety bearing different painted motifs have been recognized at Bhirrana (Rao 2005-06:61 and 64; pl.I.1.10 and Pl.III 12, 13; Fig.2, 1-10). Based on such painted motifs only since long a section of scholars strongly hold the view that Indus valley people did not use spoked wheels, rather use of solid wheel had become a "....characteristic feature of the Indus civilization" (Wheeler1962:74). Further, it was also emphasised that the spoked wheels were supposed to have been introduced in India by the chariot riding Aryans (Sharma 2006:18-20). These one-sided opinions based on painted motifs failed to recognise the other side logical meaning of such motifs. The crux of the issue lies in the objective of paintings since these motifs are just not decorative in nature. The Harappan craftsmen through paintings on the toy model wheels, has accomplished with cleverness and skill the objective of implying the manufacturing technique and nature of the then existing real wooden wheels. If existence of solid wheels is contrived through a set of painted motifs, it means the severy motifs are self-suggestive of the relative existence of a contrasting kind of wheels. In this case we have a separate class of wheels in the form of spoked wheels, which are exclusively painted with radiating bands emanating from the hub provided in the centre of wheel.

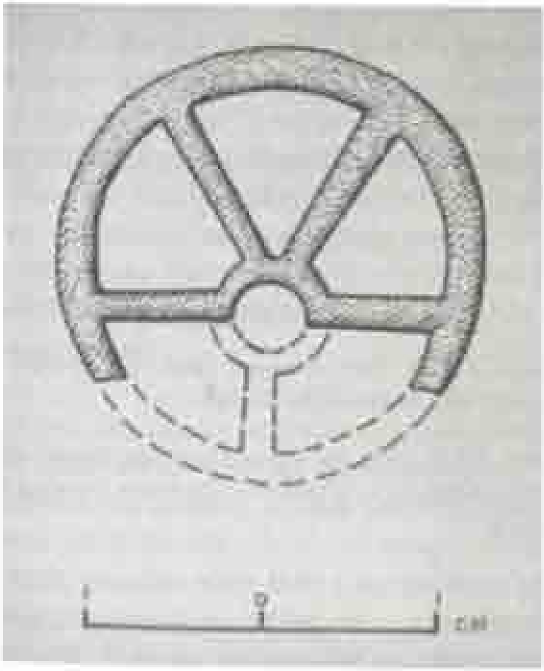

Fig. 1 : Terracotta toy wheel model with painted spokes (after M.S.Vats)

In the light of the above information we cannot hold any more that the Indus valley proper did not have spoked wheels. The trickling evidence as it has emerged from Harappa proper perhaps has begun to unlock the mystery of spoked wheels. There might have been many more such spoked wheels in the collections of excavated Harappan sites from the Indus valley. The importance of such items has either gone unnoticed or was it a taboo to term them as spoked wheel. One does not know, Otherwise the present spoked wheel from Harappa under study would not have become a casualty of misinterpretation. We need to research them from the published and unpublished collections from the Indus valley region.

Sites like Chanhu-Daro and Harappa have yielded bronze/copper cast solid wheels in association with copper toy carts. (Mackay 1943:164, pl. VIII, 1 & 1a;

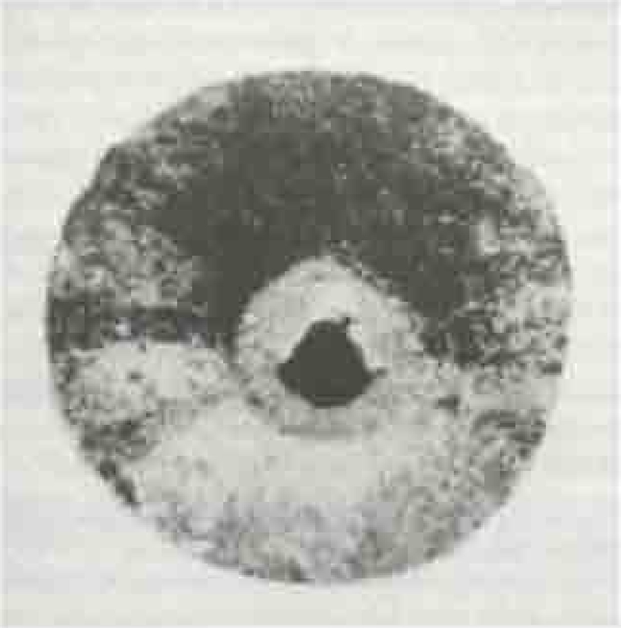

Fig. 2 : Line drawing of copper cast spoked wheel from Ganeshwar (After the rough drawing supplied by R. C. Agrawal)

Vats1940, vol.I:99-100, vol.II: 35, pl.CXXV). This had also lent an added support to the belief that solid wheels in the entire medium available alone were in use during the Harappan civilization. There is also a dearth of copper cast spoked wheels from the Harappan world so far. However, recently R.C.Agrawal, Ex-Director of the Department of Archaeology and Museums, Jaipur has informed the author in writing that the famous chalcolithic site at Ganeshwar (37° 40' N; 75° 51' E) in Rajasthan has the distinction of yielding a copper cast wheel with thick spokes which has not been published so far. He further added that this wheel was meant for a small vehicle used as toy for children. A rough line drawing of the same is also provided by him (Fig. 2). It appears, when intact, the wheel had six spokes. Due to damage two spokes with rim portion are missing. Now, the extant portion has only four spokes.

All these say Harappan spoked toy wheel models of terracotta were the objects of interest for interpretative archaeology. Now, Ganeshwar has sprung a fresh evidence of spoked wheel cast in a different medium like copper, though Ganeshwar is a contemporary chalcolithic site, with which Harappan cities and villages had close relationship. That is why the significance of this unique find should be appreciated in a wider perspective, *i.e.* against the back drop of the existing relationship between the Harappan and the contemporary copper mining chalcolithic societies of Rajasthan and its impact and ramifications in the developmental course of Harappan civilization.

Acknowledgement

The author is thankful to Dr.R.C.Agrawal, Ex-Director, Museums and Archaeology, Jaipur for providing unpublished information and rough line drawing of the copper cast spoked wheel from Ganeshwar. For further details about Ganeshwar culture please see Dr. Agrawal's articles published in Indus civilization (ed) G.L.Possehl (1982-83); Frontiers of Indus civilization (eds) B.B.Lal & S.P.Gupta (1984).

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A Rare Siva Linga at Budholi, Sahanspur, Dist. Dehradun (Uttarakhand)

Budholi is a small village located (Lat.30° 25' 07" N, Lon. 77° 58' 15" E) on the right bank of a seasonal rivulet Nibi at the lower catchment of Mussoorie hill range, towards north-west of Dehradun under administrative control of Sahanspur block. The village is approached through a pucca motorable road from Prem nagar, whence another road bifurcates it to towards the right direction leading to the University of Petroleum. On the back side of the university campus a piece of land, about 180x250 metres; elevating in a sloppy pattern, consists of two temples in the name of Goddess Dudha devi. However, both the temples are Siva temple as evidenced by the *sivalingas* enshrining inside the *garbhagriha*. One of one, more than hundered years old is said to be built by Moti Ram Kukreti first descendant of Kukreti family in this village whose old haveli still exists in the ruined plight near the village. The villagers have a special attachment with this place because they worship it in the name of their *kula devi* (family goddess).

Beside two temples and a *dharamshala*, there are other sculptures, including three *sivalingas*, four *amlakas*, a *vyal* (broken), a *Nandi* (broken), a piece of capital pillar showing *gaja* (elephant), *Ganesha* (broken), large size stone blocks and paintings on the ceiling of *garbhagriha* of the old temple. The main temple (Pl. 1), facing east is raised on a single layered stone platform. The stones are finely dressed measuring 30 x 50 cms. to 35 x 55 cm. and appears to have been taken out from the original temple which might have ruined generations ago. Some stone blocks were taken away by the local residents for their house construction.These stones can be still seen on the walls of the old houses of the village.

The temple (Pl.1, 2, 3 &4) consists of a square *garbhgriha* and rectangular *antarala* . *Antarala* is supported by four pilasters. The outer wall is plain without any ornamentation. On the foreside of wall between the *antarala* and *garbhagriha* three ridges are relieved raised upto the top of *shikhara*. The pointed *shikhara* is bedecked with miniature shrines on four sides. This decoration is done nearer the *sukanasika*a usually found in the early medieval temples. The roof of the *antarala* is flat. The *antarala* is reached through three sides by foliated arched *dwara*. The same decoration is done on the doorframe of the *garbhagriha*. Inside the *garbhagriha* the beautiful paintings are made on the border of the ceiling. In the center of the sanctum enshrines a unique *sivalinga* on a square platform.

At about 15 m. left of the main temple exists another temple of Siva (Pl.5). It was built few years back by the villagers. Simple in style and masonry the temple consists of a *garbhgriha* and *antarala* supported by two rectangular pillars. The outer and inner walls of the shrine have no ornamentations.Both the temples are white washed which gives an adverse view of the site.

The important among the sculptures is a *sivalingas* (Pl.6, 7, 8, 9 &10) enshrined inside the sanctum of main temple (Pl.2, 3, 4). It is one of the most perfect pieces of sculpture of its kind and is of great value in connection with the *linga* worship. Rubbed very badly it is not known about the *linga* whether it was in this temple from the beginning or came into existence at a later period. It is made of greyish sandstone which is very compact in its composition and most probably was brought from other place.

Erected on a stone platform of 132x 132cms dimension, the *sivalinga* measuring 122 cms in height, is decorated in three parts i.e. the lower part , upper part and top most part. The lower is octagonal, upper rounded and plain while the top most is decorated with an image. It appears that *Sivalinga* is erected with a definite proportion prescribed in the texts. The *Brahama bhaga* is hidden inside the earth which is invisible, the *Vishnu* and *Rudrabhaga* are visible. Octagonal *Vishnu bhaga* has vertical fluted facets upto the height of 43 cms. These facets are of equal length and width. The *Rudra bhaga* is rounded above the *Vishnu bhaga* which also measures the same length as the later. The *brahamasutras*, over it are badly rubbed and invisible. On the top in place of the *sirovartana* the *Rudrabhaga* is protruded towards the front. However the backside is flat over which the image is raised in *padmasana*. The image is rubbed so badly that it can not be ascertained whether it is a male or a female.

Sivalinga is widely worshipped in the Siva temples by the Hindus. The tenets of *linga* worship is the worship of the creative energy of God, interpreted by the sense perceptions of man represented by the symbols representing yoni and *linga* in union, has apparently been as old as man history (Krishna 2003:21) .The *sivalinga* with *yoni pitha* is teneted as the combination of *prakriti* and *purusha*. The *samkhya* theory of *purusha* and *prakriti* is also idealized in the system of the *saktas* in which *siva* representing the *purusha* always remains passive, while the great goddess endowed with dynamic activities, symbolizes *prakriti* (Benergia2002: 493). It is believed to be an oldest form of *siva* wherein the god is worshipped in the *nirankara rupa* (without anthropomorphic shape). Most of the Saivite temples all over the country or anywhere else, whether new or old are enshrined with a *siva linga* inside the sanctum. The *linga* also manifests the existence of three supreme gods of Hindu pantheon; the Brahma, the Vishnu and the Mahesha in one place hence its religious significance augments for the followers. In *Skanda Purana* the *linga* is narrated as the *siva* while the *yonipitha* as the *Vishnu*. There are numbers of ancient text wherein detailed accounts on *sivalinga* are mentioned category wise, among them are the *Agamas*; (*kamikagama, suprabhedagama, Muktagama, karanagama*), *Ramayana, Mansara, Mayamata, sidhantasaravali, puranas (Sivapurana, skandpurana, lingapurana, karma purana and vayupurana) and tantras* (Rao1914: 75-99).

Siva lingas, on the basis of material used for making, are broadly divided into two categories namely, the *chala linga* and the *achala linga*, that is the moveable and the immoveable. The former is further divided as the *mrinmaya* (made of earth), *lohaja* (metal), *ratnaja* (precious stones), *daruja* (wooden), *sailja* (stones) and *kshanika* (temporarly made for the occasion). The second type is divided as the *svayambhu* (which came itself into existence), *purva* (ancient), *daivata* (worshiped by deities), *ganapatya* (worshiped by the ganas), *asura* (worshiped by asuras), *sura* (worshiped by suras), *arsha* (worshiped by Rishi), *rakshasas* (worshiped by rakshasas), *manusha* (worshiped by human beings), and *bana linga* (Rao 1914: 75-101). The description of the *bana linga* is not mentioned.

The jurisprudence of the *linga* worship by the human beings is made under the *manusha linga*. This sort of *linga* is considered as *madhyamadhama* which is said to be the middling among the inferior variety. It is mentioned in the *agamas* that the percepts and the rules therein, are inevitable to follow for making *manusha linga*. The *manusha linga* is made up of three parts; the lower, middle and top, called as the *Brahama bhaga*, the *Vishnubhaga* and the *Rudrabhaga* respectively. The last one possesses the *Brahamasutras* (Rao1914: 80-81).

Instead of other categories, there is a *mukhalinga* type of *sivalingas* wherein the face of *Siva* is carved on the *Rudrabhaga* of the *linga*. The *mukhalinga* type is distinguished from all other *lingas* in that it has one or more faces sculptured on it. These faces may be on the *Rudrabhaga* and on the top of it known as *sirivartana*. It is worthy to note that merely faces of Siva, in different names, are carved on the *linga*, not the complete image. Typologically, described as above and in the *Agamas* and other ancient texts, the *sivalinga* of Budholi does not correspond to any one else. Hence it can not be placed under the category referred as above.

Another concept of the *linga* is of the *lingodbhavamurti*. In the description of *amsumadabhadagama* the *sivalinga* is narrated as 'the figure of Siva in the aspects of *Chandrashekharamurti* which should be carved on the front of the *linga*. In the *karanagama* it is stated that one fifth part of the *linga* is left from the top and same at the base of *pujabhaga (Rudrabhaga)* without any sculpture. This obviously reveals that the image of siva should be on the middle part of the *Rudrabhaga*. This text further states that on the right of the *linga* and near its top Brahama should be represented in the form of *hansa* (swan) while Vishnu should be carved on the left at the foot of the *linga* in the form of a *Varaha* (boar) (Rao1914: 75-106).

A *sivalinga* of similar feature was found at Kagajipura, dist. Dacca, which has been published in the annual report of the ASI in 1924-25. In this four feet high *sivalinga* has shown a goddess emerging out at its top. The half length figure of the goddess has four arms having front hands in *dhyanamudra* and back hands carrying rosary and manuscripts. Assigened to 11th-12th cent. AD. the scholars assumption regarding this is that it is a goddess in co-itus with the phallus and combination of *purush* (siva) and *prakriti (Mahamaya)*.

The *siva linga* found at the Budholi village is a full size image on the *linga* which certainly is not a female figurine as evidenced with a suppressed chest. This *linga* is rare of its kind. The depiction of the image over the *linga* enhances certainly its conceptual as well as its artistic value and a monstrous thought of the worshipper of the lord Siva. The concept behind this sculpture might be the same as narrated in the *lingapurana, kurmapurana, vayupurana and sivapurana* (Rao 1924:105-106) which runs as follows; The quarrel occurred between the Vishnu and the Brahama for superiority. At this juncture a *linga* appeared with a great cosmic fire. By seeing that they both set about to measure the *linga*, but they could not do so. Then they realized that there certainly was something greater than them. They began to praise the *linga*. Pleased with their prayers *Siva* manifested himself from the *linga* and said that they both, the Brahama and the Vishnu, are born from him (*Siva*). The artisan of this *linga* might want to narrate the same story in this sculpture.

Although, the image is so badly oblitrated that it is difficult to identify it on the basis of its features and attributes yet it is, indeed, the Siva seated in the *padmasana* under the tenet of *lingodbhavamurti*. The assignable date of this *sivalingas* is 11th-12th century AD.

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A Study of Painted Motifs on Chalcolithic Malwa Ware

Among the Chalcolithic cultures of Central India the Malwa Culture was the most predominant and widespread. It was named because of its wide distribution almost over Malwa and even beyond. H.D. Sankalia first identified it in the excavation at Maheshwar. Malwa culture, attested by Black-on-Red pottery (so called Malwa ware) seems to have regional variants as shown by the pottery at Eran. Besides Malwa Ware, Cream Slipped Ware, Coarse Red/Grey Ware, Jorwe Ware, Lustrous Red Ware, Red Slipped Ware, Black - and - Red Ware, Burnished Ware and other wares are also found associated with it.

In case of Malwa ware, the designs were executed on the pots before they were fired. The surface was decorated with various designs in black or light reddish black. The pottery in this ware was painted mainly in the area between the rim and the body on the outside and occasionally inside, especially on bowls. Malwa ware which is extremely rich in form and painted motifs have a wide range of stylistic animal and human designs along with geometrical and non-geometrical patterns. It has more than 650 motifs in all. In the geometric designs - linear patterns, triangles, lozenges vacant, solid or hatched are the main types. Next to the geometric designs are stylized animal, floral and natural scenes and a few human figurines also. Depictions of faunal motifs show their interest in the animals found around their settlements. The depiction of human forms occurs in symbolic or highly stylized manner.

The motifs and designs on the painted pottery have been thematically classified as: (a) Human figures (b) Animal figures (c) Other symbols and designs.

In the present study a detailed analysis of the themes of human figures, animal figures and symbols and designs as encountered in the paintings of the Malwa ware has been attempted.

Human Figures

Many specimens bearing human depictions are noticed on this pottery from different levels of Malwa period. The paintings are invariably executed in black pigments obtained from organic and inorganic substances. Rendering of human figures on the ware is highly stylized, decorative, impressionistic and extremely symbolic.

Dancing Human Figure

One of the most captivating and aesthetically pleasing sets of motifs on the Malwa ware encountered is the myriad dancing figures. There is a lightness of spirit and buoyancy of line form in these figures and they capture the spirit of that Proto-historic culture, its essential care of aliveness and creativity. The scene of a community/group dancing by four individuals in a joyful mood, the gaiety and festivity of the two human figures engaged in dancing, the row of human figures

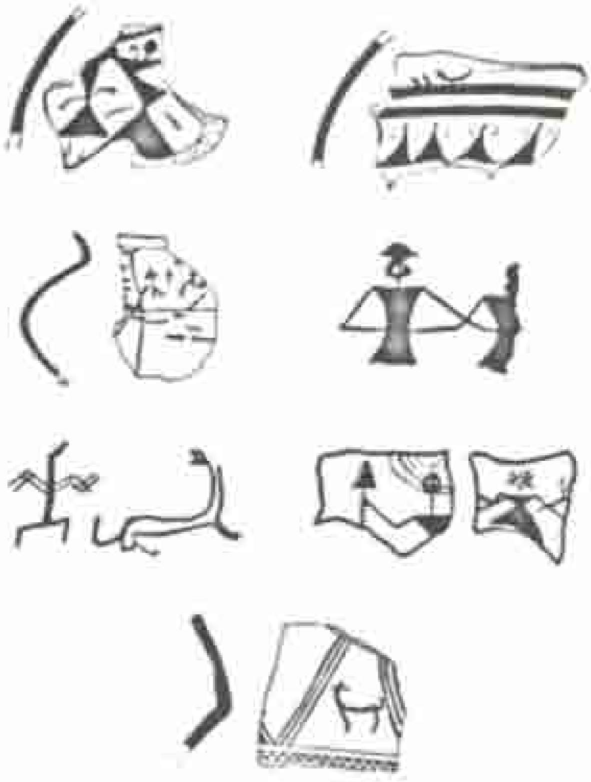

Fig. 1

in stylized manner, the human figure with peacock decorated with dots inside the body are worth mentioning (Fig.1). Largest dancing groups have been painted on Malwa ware reported from Navdatoli, especially on *lota* shaped vessels. The swaying action was possibly an artistic technique to indicate the rhythmic movement of the dancers. Dancing figures have affinities with their West Asian counterparts specifically those from Tell Halaf and Chagar Bazar, where we see a row of dancing figures holding hands (Sankalia 1970:312).

General Human Figures

Besides the dancing figures, we have specimens of general human figures on Malwa ware. The themes and compositions here may not be as lyrical but are equally informative in terms of providing us insights into the mode of living of the Malwa people. In this connection mention may be made of a pair of human figures with a circular head, solid body filled in and curved inward at the waist. The turban on the head of the man is noteworthy, as it shows his festive mood. The motif depicts bust and above portions in a stylistic way. The gently raised and curvilinear suspended hands are probably holding suspending flower bunch. Other examples include human figure possibly a small girl executed with two triangles opposite to each other like a mirror image. Unusual human figures have been painted inside a channel spouted bowl, which was probably used for rituals. The artist has painted the human figures in varied postures on Malwa ware. An Anthropomorphic depiction of the Mother Goddess indicative of wrath and energy is the first evidence of Mother Goddess worship on Malwa ware (Sankalia 1960:312-32). The negligible representation of war or war like activity is an indication of peaceable and harmonious character of this culture.

Animal Figures

The Chalcolithic Malwa people lived in close symbiosis with their ecological surroundings. Domestic as well wild animals have been painted on Malwa Ware.

Domestic Animal

Bull

Bull, the traditional symbol of fertility is one of common subject of painting on the Malwa ware. They have been depicted with and without humps. Humped Bull is executed in single line drawing, with horns out turned and without a tail. Sometime abstract painting with thick outline and long wavy horns are also seen. Cross hatching pattern seen on the body of the humped bull and horns are out turned and joined from end to end with straight line (Fig.2 and 3). Bulls without humps have been executed in thin line drawing showing legs, no tail has been made. The horns are going outward almost parallel to the body and are decorated with a row of dots coming downward. In the bull figures without humps at Kayatha, it has been observed that the number of lines to depict the legs often varies. Dangwada, famous for its bull representations is rendered in highly stylized manner, with out turned horns and four legs with a long bushy tail at the end. The phallus of the bull has been shown prominently. This phenomenon might have been symbolic representation of some sort of phallic worship.

Dogs

Dog figurines were often depicted among the painted motifs at a number of sites both in Central India and Deccan on Malwa ware (Fig.4). Dog figurines were shown with thin line, decorated with row of dots, one

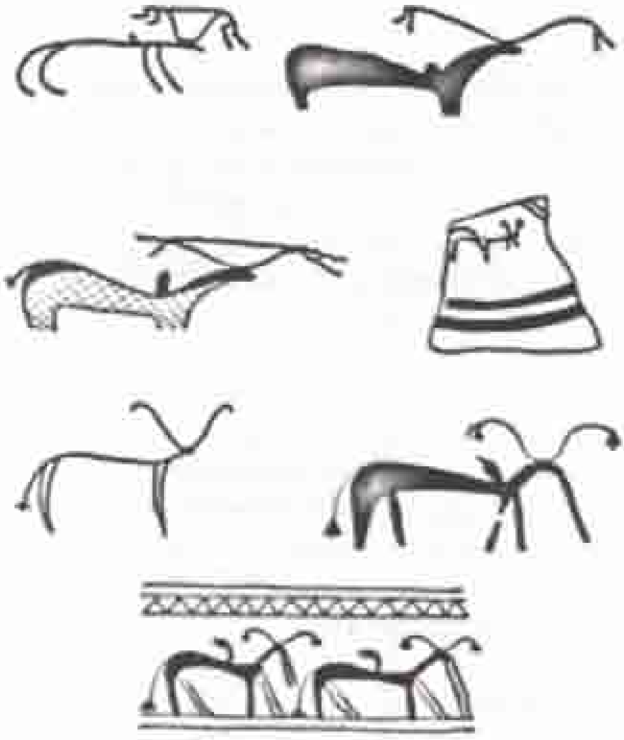

Fig. 2

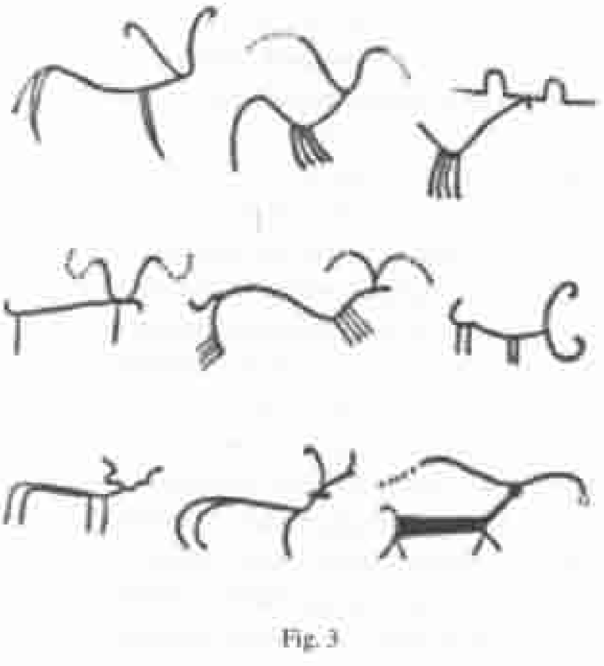

Fig. 3

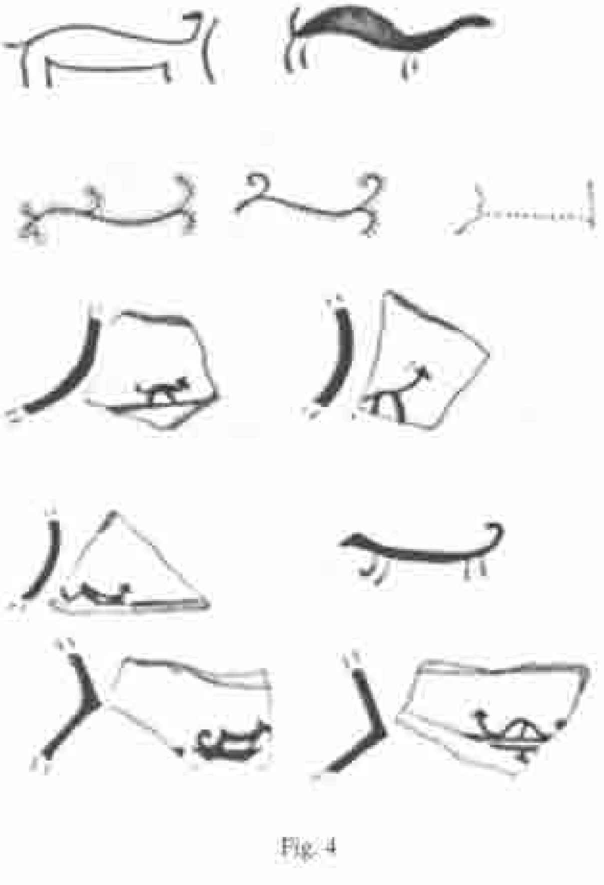

Fig. 4

fore and one hind leg with sitting, standing, relaxing and attacking postures. The dog, which is represented on a large number of sherds, was probably a well-loved pet. In all probability, it helped the Chalcolithic hunter in his forays, and even seemed as a watchdog against the lurking tigers, panthers and other denizens of the forest, nearby. Maximum numbers of dogs painted on the Malwa ware are from Daimabad.

Camel

There are only three paintings of camel on Malwa Ware. One from Inamgaon, one from Chichali and one from Jorwe Ware at Daimabad (Fig.5). Prominent humped back, with long neck and upturned tail depicts it walking leisurely. The Chichali specimen is doubtful, but the animal shown with long neck, wide opened mouth, upraised ears and the entire body is filled up with hatchings very similar to the camel.

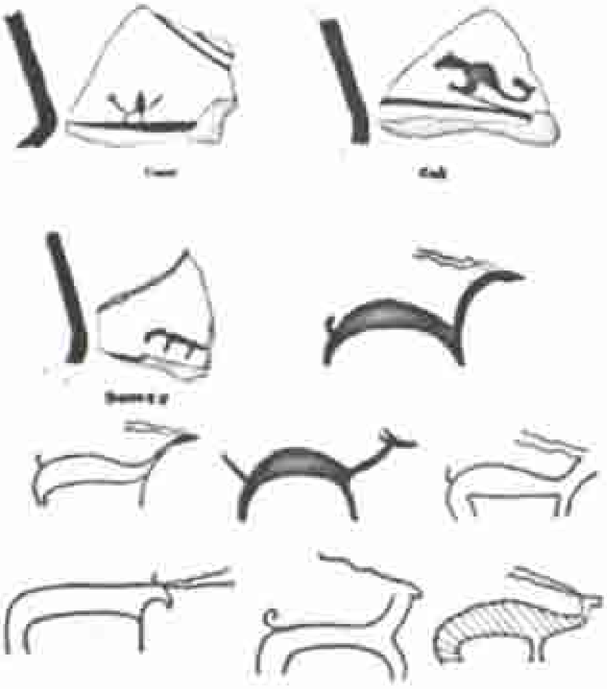

Fig. 5

Donkey

The donkey is found represented on wares from Inamgaon only. (Fig.5) It was possibly used by the dwellers to carry themselves or their goods from one place to another place. It was rendered in thick brush strokes with prominent head and straight body. Only two legs have represented along with a thick tail. (Dhawalikar 1973)

Horse

Chichali possesses the unique distinction of having produced a horse motif painted on a Malwa ware sherd. The animal with an elegant stance curved back, long neck bent downwards and a bushy tail curled at the tip is painted in black on a dish.

Wild Animal

Rabbit

No representation of this animal on pottery has been found so far from any of the known Chalcolithic sites except at Chichali, which is painted in black above the neck of a Malwa ware vase. It is a diminutive animal having short, upraised tail, and ears. The entire execution speaks of the animal being in a state of flight.

Antelopes

Antelope seems to be the favorite subject of the Chalcolithic Malwan artist. It has been frequently painted at Navdatoli, Songaon, Dangwada, Nagda, Chichali, Mahidpur, Inamgaon, Daimabad and Avra (Fig. 5 and 6). The antelopes have been rendered in different modes – realistic, impressionistic, stylized, abstract, decorative etc. The antelopes appear lively vibrant and most graceful depicted in a state of agitation. Another striking feature is that a number of antelope figures have been shown mating with conspicuous organs of generation. Dots, which have been utilized in

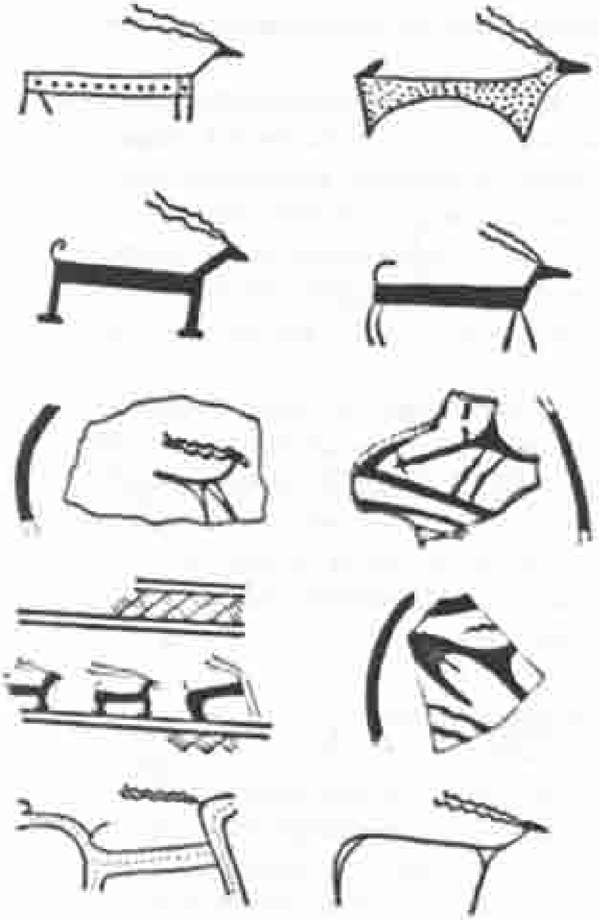

Fig. 6

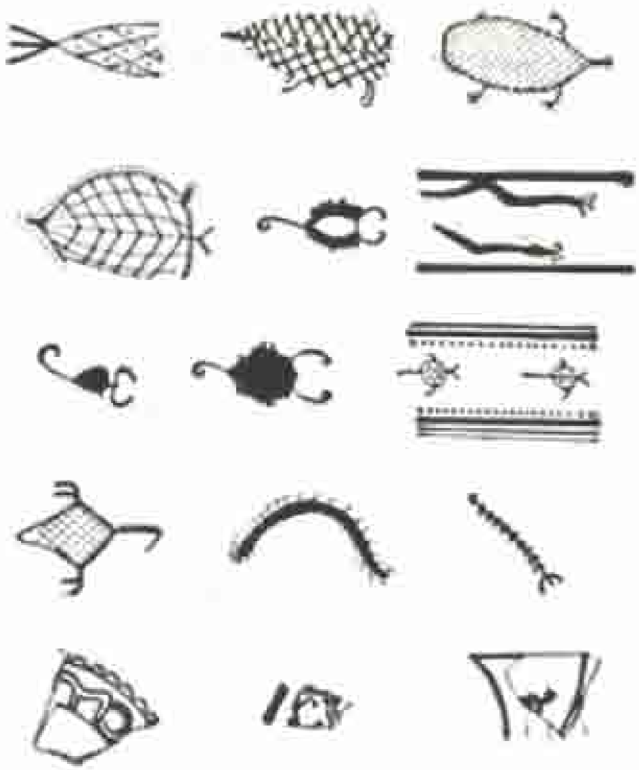

Fig. 7

decorating various faunal motifs, have been also used for antelopes too. Antelopes with straight backs are seen at Central Indian and Deccan sites. Gracefully carved backs are emphasized more in Malwa ware, especially at Navdatoli. Next to the bull it is one of the most popular themes of Chalcolithic Malwa art.

Aquatic Animals (Fig. 7)

Fish

The Malwa Chalcolithic sites are generally reported from the riverbanks. This may be reason as aquatic animals often painted on the pottery. Fish motif has been depicted in single line drawing with criss-cross lines carrying dots inside.

Crocodiles

The crocodile figures on Malwa ware painting is reported only from Navdatoli. Massive oval body with lattice and dots designs, hind and fore legs with short tail is distinctly depicted.

Snails

Snail depiction has been found at Navdatoli. The snails have been painted by a thick brush full of colour. One is solid and other is decorated with dots.

Insects and Birds

Depiction of Scorpion is widely found only from Central Indian Malwa Chalcolithic sites. This venomous creature holds a morbid fascination for Chalcolithic Malwan artist. Scorpion body with cross-hatchings, long tail out turned at the end is generally depicted. Navdatoli scorpions are decorative and impressionistic, whereas the scorpions from Dangwada are rendered in thick brush strokes, which are more solid.

The peacock is also one of the most widely depicted motifs on Malwa ware (Fig.8). We find peacocks represented in numerous styles- the impressionistic mode, abstract, geometrical filing in bold work decorative in thin lines and in highly symbolical forms too. Conventionalized peacock, peacock in crouched position, impressionistic image of a procession of peacock, elongated neck, decorated with dots, are special feature of painted peacock of Malwa ware.

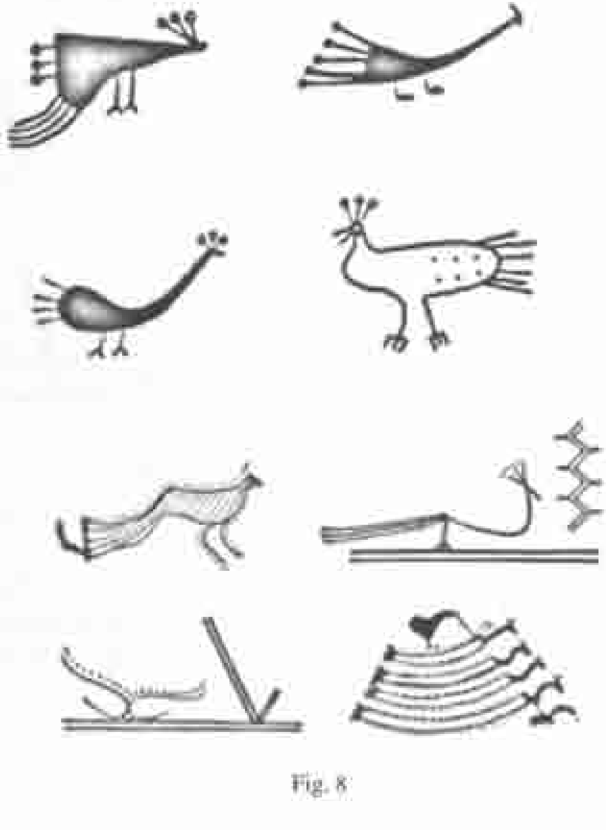

Fig. 8

The faunal motifs as evident from the Chalcolithic Malwa culture belong mainly to the Malwa ware. The vastness of the faunal assemblage painted on pottery comprising mainly antelopes, peacock, bull and other zoological remains support to a favourable ecological setup during the Malwa culture. Rendition of bull, abundant from Kayatha and Dangwada depicts sort of fertility symbol. The antelope with graceful shape and prominently displayed organs of generation is very common and often expressed motif in Malwa ware painting. The dog, insects, aquatic animals are also depicted on Malwa ware, which shows thickness of forests and availability of water in this regions. The peacock painting on Malwa ware showed the popularity of the bird.

Designs /Symbols

Beside human and animal figures Malwa ware abounds with a wealth of stylized symbols and designs. Many of the motifs were painted for ritualistic purpose while others were related only with aesthetic sense of the vessels. All motifs have been sub classified into geometrical design, natural designs, arms design and miscellaneous designs. Among the geometric designs diamonds designs have been encountered at almost all the sites in varied forms and manifestations. Pots have been elaborately decorated with diamonds in rows. They are crosshatched with very fine lines. Between the gaps of the diamonds are solid dots. At Inamgaon solid filled in diamonds were very popular. Triangle designs were also a popular element of design on the Chalcolithic Malwa ware – as they were found painted on the almost all the sites. Row of triangles, thick suspended triangle, between horizontal bands, thin line represented triangles, solid filled triangle and other varieties of triangles can be traced on Malwa ware. Flag designs are also quite popular in the Central Indian Malwa Chalcolithic. It has been found on Malwa Ware of

Navdatoli, Nagda, Dangwada, Kayatha etc (Fig.9). The flag designs were possibly indicative of some religious totems, conflicts or distinction of tribes. All the flag design have been found at the Central India only. Some are in pair. But most common feature was that they were accompanied with horizontal lines to enhance its aesthetic value.

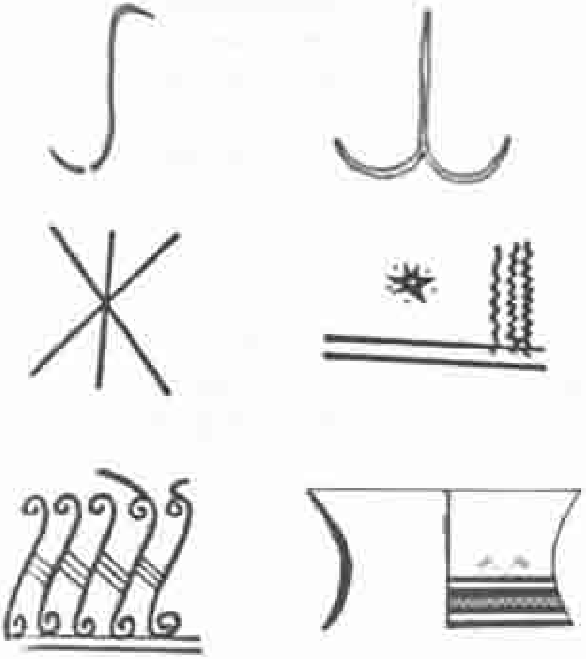

Fig. 9

Among the natural designs solar motif, star motif and plant motif were common (Fig.10 and 11). The resplendent sun has been amply depicted on the Chalcolithic Malwa ware with thin line painting of double circles, solid sun, rising sun in large circle with four representations in four partitions and some time with hills. It has been observed that the solar symbols are in curved strokes at Navdatoli and in straight radial spokes at Nagda and Kayatha (Fig.12). The Navdatoli artists have rendered the solar symbol in a most original and beautiful manner. Five-armed star motif has been depicted frequently on Malwa ware. Maximum representation of the star motifs has been found at

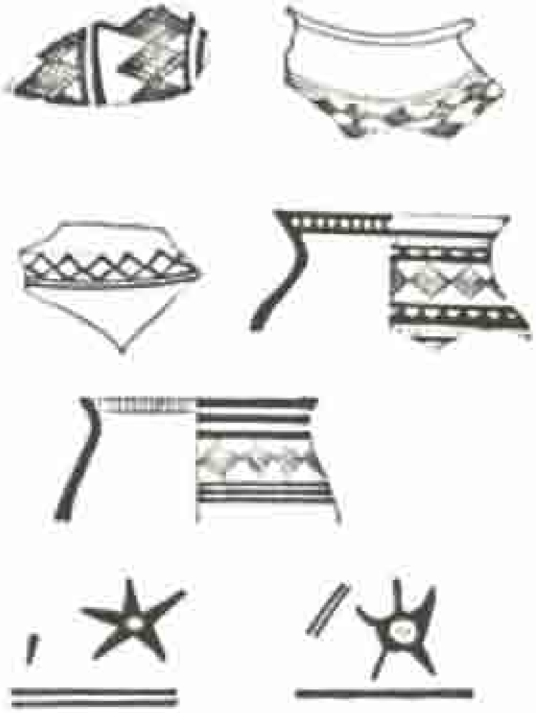

Fig. 10

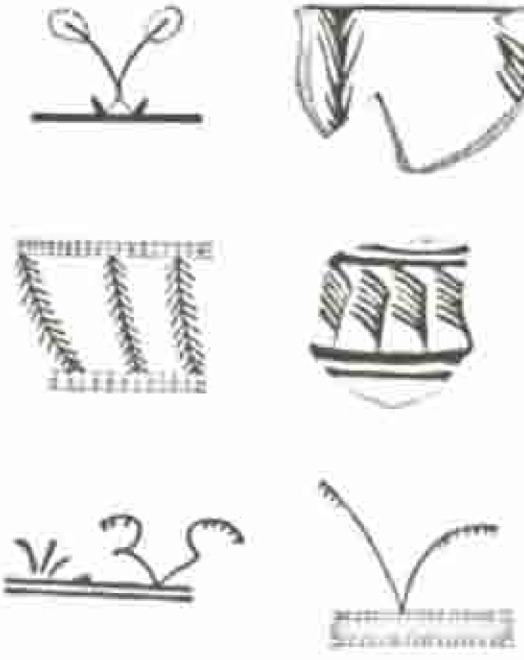

Fig. 11

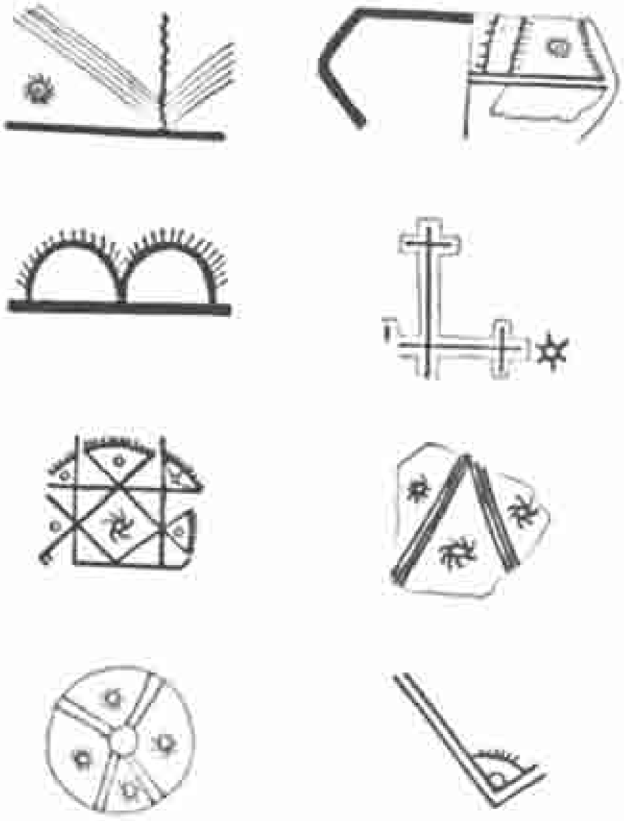

Fig. 12

Navdatoli. They were depicted in bold lines and filling in there by giving a solid appearance. Some star motifs are in stylized manner. A vast variety of plants and leaves have been depicted on Malwa ware though majority of them are unidentifiable. The plant motifs from Nagda and Navdatoli are quite delicate but a plant symbol from Inamgaon is bold and solid with thick brush execution. It is difficult to identify the botanical species, as the morphological details are vague and somewhat stylized. However the paintings do express a large range of plant designs.

Among the arms designs - bow and arrowhead designs are primarily encountered at Navdatoli and Daimabad (Fig.13). These were possibly used for hunting and may even have been used in tribal conflicts. These arm motifs are rather symbolic and simple and do not reveal details of how these instruments were made. For depiction of arms, thin line and thick brush strokes have been used. Some graffiti representations are also encountered at Navdatoli on Malwa ware. Some arrow motifs are solid while some are broomed. It is obvious that the chalcolithic Malwa people were fond of hunting and were acquainted with the bow and arrow, which they must have carried on their hunting expeditions. A signal specimen of *Trishula* has been found from Navdatoli that could be identified as trident of Shiva (Fig.13).

Among the miscellaneous designs mention may be made of hook designs, wavy and zigzag lines, comb design, boat design etc.that has been painted on Malwa Ware. Hook designs with or with out row have been found from various sites, on the Malwa ware. It is a popular decorative motif, which is mostly encountered at Navdatoli. An interesting fact is that the hook designs are depicted between horizontal bands, some times as many as 6 to 7 Lines. The rippling rivers appear to have inspired the artist in the painting of the many wavy and

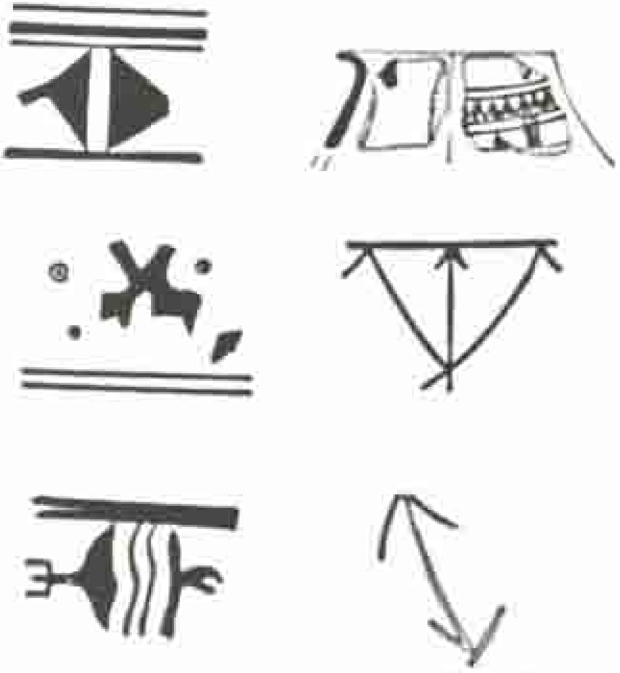

Fig. 13

zigzag lines. Majority of the wavy lines are accompanied by either horizontal or vertical line. The most exquisite comb pattern with and without handles has been painted on the Malwa ware. This design is depicted in an unusual manner, placed obliquely on the pot. Teeth of the comb design protruding from solid triangle meeting at their apexes are painted at Navdatoli. The representation of boat on the spouted vessel is seen at Inamgaon and Navadatoli. (Fig.14)

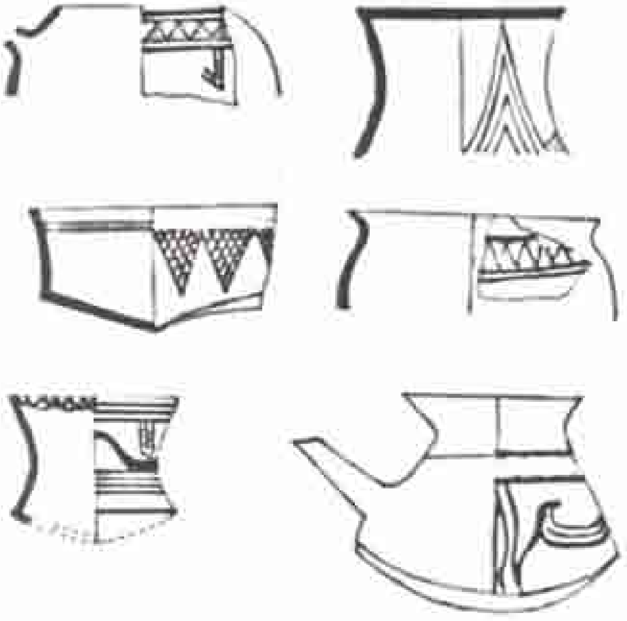

Fig. 14

Discussion

An analytical study of Chalcolithic Malwa ware depicts a society which was economically sound and whose inhabitants had the time, resources and aesthetic sensibilities to produce such a delightful array of pottery. The survey gives us very good information about dancing, which was obviously, a highly developed art form, and the prime means of social celebration. Both, male and female figures can be seen in these dances with their arms linked, dancing in unison, much like the tribal dancers today. Were these dances part of religious ceremonies, fertility rites, or were they celebrations of the changing seasons and the on set of harvesting times or plain dancing for the sheer joy of being alive and young?

The Sun, star and geometrical shaped motifs and designs also point out to a high degree of refinement of the aesthetic sense. The landscape of their times has left a deep impression on the artist psyche. It also records the animals they had domesticated, the faithful dog, the mighty bull and the occasional camel.

We can surmise the eternal presence of the forest from the animals that abound in the paintings of the Malwa ware. The graceful antelopes and bounding deer and others wild animals were certainly not domesticated animals. They indicate the unseen presence of the dense forest near by.

The bull was popular figure, not only as a symbol of fertility, and in all probability the object of worship, but a very useful animal too. Paintings of boat at Navdatoli and Inamgon further underline the close symbiosis between the life styles of the people and the rivers.

Some paintings do depict flag like objects. Wasn't it indicative of royal personages, religious totems or the paraphernalia of conflict? We also notice some trident shaped objects. Were these spears or did they have any religious significance? A further probe may provide the answer.

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Antiquity of Benisagar in the Light of New Evidence

Benisagar or Benusagar (Long. 85° 53' 39", Lat. 21° 59' 01") is situated on the border of Jharkhand and Orissa in West Singhbhum district of Jharkhand. It is located about 85km.south of the distt. headquarter of West Singhbhum i.e. Chaibasa. The administrative boundries of the district Mayurbhanj of Orissa starts just south of the village Benisagar.

The name of the village Benisagar derived from a tank called as Benisagar said to have been excavated by some local legendry ruler Benu Raja, son of the Raja of Kesnagarh. The historicity of Benu Raja is still unknown. Moreover, this area is presently inhabited by 'Hos' tribes and their language is also known as 'Hos'.

Presently, the tank Benisagar covers an area of about 500x500mts. There is an island almost in the centre of the tank, of which the approach is provided from the south side. Some brick structures are noticed on the island. A few brick mounds are also visible towards the eastern and south-eastern side of the tank. Even some structures, constructed of bricks as well as lattérite and khondolite blocks are also exposed towards southeastern side of the tank. In a recently built sculpture shed located towards southeastern side of the tank, the images of some hindu deities are kept. A few sculptures are still kept in open air as these images are in worship by the local villagers. These sculptures are of Agni (40x30cm), Ganesh (130x68x55cm & 65x35cm), Mahisasurmardini (80x45cm), Bhairav (155x75x25cm), Yamuna (68x40x20cm) and some shivalingas. Doorlintels and doorjumbs along with the architectural members are also scattered at the site. Stylistically, these sculptures and carved pieces can be dated back to the 9th to 12th century A.D.

The archaeological remains of Benisagar started attracting scholars since 19th century A.D. Col. Tickell visited this site in 1840 and was told by the local people that the Raja Benu ruled here somewhat 200 years ago. Tickell further referred "stone built ghats or embankments and having by their sides numerous richly carved stones or sculptures which may have once belongs to small temple ranged around the tank." He also described the remains of a temple inside the tank on the island. Col. Tickell further described the remains of fortress or gadhi towards southeast of the tank, which measures 275x137mts and existing with massive walls supported with bastions and towers at the corners. He also referred a few mutilated sculptures lying on a sucken platform located at the centre of the fort. About 300 yards further south to the fort, Col. Tickell noticed another brick mound called as Kacheri of Raja by the local people (Patil 1963 : 38-39).

After gap of about 35 year, in1875, Mr. J. D. Beglar inspected the site and mentioned the presence of sculptures of Ganesh, Kali, Mahisasurmardini, along with exquisite carved stone pieces at the site and ascribed them a date of 7th cent. A.D. He also referred two or three Jain images at the site. Mr. Beglar presumed that near the south-east corner of the tank embankment there are numerous old remains consisting of the ruins of at least ten temples. But none of the temples are standing (Belgar – CASI. XIII – 69-71)

Presently this site is a Protected Monument under the juricdiction of newly created Ranchi Circle of A.S.I. and maintenance and development works of the site is being carried out by the Circle.

In order to ascertain the nature and character of the partly visible structures, a systematic scientific clearance work was carried out at the various parts of the mounds located at the eastern, south-eastern and in the centre of the tank, on the island.

Inside the, tank on the island, the remains of a brick temple is exposed. This temple is in the form of a square platform, enclosed within a short enclosure wall and oriented in the east direction. The platform (vedika) measures 6x6mts, constructed into two phases. Initially it was 4.25x4.25 mts which was extended later on. This platform was exposed upto 12 course of bricks with a height of 72 cm. The flights of three steps were provided to the platform from east, Surprisingly steps are not interlocked with the structures of platform.

The platform is enclosed with a 67cm wide enclosure wall. The northern part of enclosure wall is exposed upto its 8th course and a height of 50 cm whereas the southern portion of this wall were exposed to its 6 courses of bricks. The western portion of this wall is exposed to its 7th course. The space between the platform and enclosure wall served the purpose of 1.35 wide circumbulatory paths.

The eastern part of the enclosure wall was traced about 1.30 mts further east of platform. A 6.40 x 3.15 mts size brick structure is attached from the middle or centre of the eastern enclosure wall. The longer axis of this structure is oriented in east-west direction, where its extreme eastern portion is in the shape of semi circular or chandrashila type.

The most important structures exposed attached both side north and south of above mentioned entrance are appears to be as cistern to store water for the devoties to wash their hand. The size of the cisterns are 2.30 x 1.20 mts. It seems that both of these cisterns are internally connected with the tank. The bricks used for construction of these structures are 36 x 23 x 7 cms, 36 x 23 x 6 cms, 37 x 24 x 7 cms, 35 x 21 x 6 cms.

The remains of second temple was exposed in almost centre of eastern bank of the tank. Here the remains of a small brick temple, including a Shivalinga, in situ along with bathing ghat was exposed. This ghat and small Shiva temple and the temple exposed in centre of the tan on the island are constructed in almost same alignment.

The exposed ghat is constructed of bricks arranging them on its edge. Its lower portion is touching the water of the tank and upper portion is leading towards a small Shiva temple.

This Shiva temple is very small and consists of only sanctum santorum, which measures 1.23 x 2.32mts. The wall of the temple is 80 cm wide. The entrance is from the east which is 113 cm wide. A Shivalinga carved like as Phallus was found in situ in the temple. Surprisingly this Shivalinga is erected in a rectangle Yonipitha measuring 60 x 70 cm constructed of bricks. The excavation was closed in a half way due to monsoon and will be completed in next field season. The Shivalinga installed in this temple is 42 cm long. Interestingly this Shivalinga has only two parts unlike others. The octagonal lower or Bhrahamabhaga portion is 20 cm long and having a crude surface but upper part or rudrabhag of this linga is 22 cm long and finely carved with smooth surface having a design of phallus.

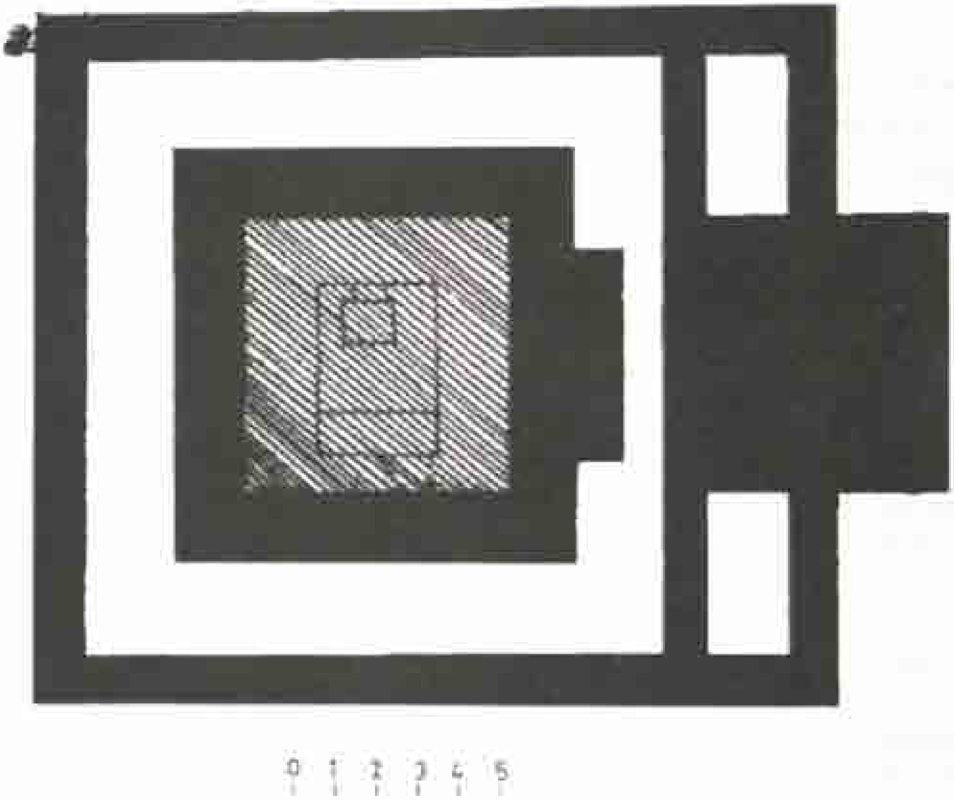

Fig. 1: Plan of excavated temple on the island, in the centre of the tank at Benisagar, Distt. - West Singhbhum, Jharkhand

Towards south-east of the tank another shapeless mass of bricks and latterite bocks was also noticed. Scientific clearance of this debris exposed the plan of another temple, constructed of dressed latte rite stone blocks. This temple is also very small but planned in triratha. A small replica or model of temple with prominent amlaka, constructed of stone, is also recovered from this site, further indicates about the style of original temple. Due to lack of time the complete plan of this temple could not be exposed and left for coming season.

The above mentioned discoveries of the remains of these two temples further pushed back the antiquity of the site to 5th to 6th century; A.D. The tradition of construction of brick temples can be ascribed to the Gupta and Post Gupta period whereas the laterrete triratha temple dateable to 9th – 10th century. The brick size used in the construction of these temples, exposed at Benisagar, also hints in the same direction.

The evidence of these excavation and the available Shivalingas in the premises of Benisagar further indicates that probably this place was developed as worship place of Astashambhu. Possibly, the number of Shambhus might have been increased further in the later period. As the concept of Astashambhu flourished during the mediaval period in the eastern India by establishing eight Shivalinga. During medieval period the concept of establishing and worshiping of astashambhu was also flourished at Khakparta in Lohardaga Distt. of Jharkhand, Kiching in Mayurbhanja Distt, and Bhubaneswar in Orissa. The recent excavation conduct at Khekparta revealed the remains of eight small shrines installed Shivalinga which further support the above mythological philosophy.

Though the above mentioned excavations are limited in nature but the evidence gathered from these excavation are very important. Earlier the date of the site was assigned to 9^{th} to 12 cent. A.D. on the basis of only sculptures and architectural member, influenced with Orissan art and architecture scattered at the site, but these brick temple exposed in course of scientific clearance, opened a new dimension in history and archaeology of Jharkhand pushing back the antiquity of Benisagar to 5^{th} – 6^{th} cent. A.D. The field work of coming season will further reveal other facts about the site.

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A Recently Discovered Copper Hoard from the Ancient South Panchal Region

Discovery

It was 31st July 2007, when a rural acrobat noticed some objects appearing crusted with green patina, on a spot exposed by heavy rains on the surface of a rain-gully cum *kuccha* track - passing through an elevated area within the cultivated fields. Curiosity prompted him to dig at that spot which revealed a hoard of copper artefacts. He collected them and quietly left the site in order to keep the secrecy of his finds. Realizing the metallic value of the objects he thought to sell them to earn some easy money. However, this information somehow trickled to the Bela-Police Station. They promptly swung into action, raided the hiding place, recovered and confiscated the hoard and kept it in safe custody. Additional District Magistrate, Auraiya, under whose jurisdiction the area comes, immediately informed the Director, Directorate of Archaeology, Government of Uttar Pradesh, about these findings for necessary action by a fax message of 16th August 2007. In turn, Director (Archaeology) directed Nar Singh Tyagi, Assistant Archaeological Officer to inspect the find-spot. He inspected the site on 20th August 2007.

The Directorate of Archaeology, instantly sensing the archaeological significance of the discovery by perusing the inspection report of Tyagi, deputed R.K. Srivastava, an experienced senior officer, to explore the find-spot with Tyagi and to procure the artefacts for further study. The exploration of the site showed that the find-spot of the copper artefacts is a part of an ancient site, which comprises a thick cultural deposit. In compliance of the orders of the District Magistrate, Bidhuna police handed over the entire hoard to these officers. Now, it is being cleaned by the chemist and thereafter it would be treated with preservatives. After cleaning and further study, it would be placed in the museum for display. This is how; an active Police Team and District Administration could save an ancient Copper Hoard from being melted.

Find-spot

The site, from where the hoard in question has been recovered, is located to the south of the village Udaipurwa (marked on Topo Sheet No.54 N/9 as Purwa Udai), near the Arind or Rind River - a small tributary of the Yamuna River - on Lat. 26° 46' 03" N and Long. 79° 33' 46" E. This village comes under Bidhuna Development Block in Tehsil Bidhuna of the newly carved district of Auraiya in Uttar Pradesh. The area placed under this district formerly formed the eastern part of district Etawah. The Udaipur village (Purwa Udai) is located at a distance of about 18 km to the southeast of Bidhuna. A metalled road leads to the village. Bidhuna is about 41 km from the district headquarters Auraiya and easily accessible by a motor road on Auaiya-Kannauj route. The nearest railway station Dibiyapur or Phaphoond, is connected with Etawa in the west and Kanpur in the east. Geographically Auraiya district is situated in the lower Ganga-Yamuna *doab* of the Upper Ganga Plain. This area was under the territory of ancient South Panchal with its capital at Kampil.

The site is extended roughly in an area of 1.5 - 2.00 acres and is presently converted into agricultural field. The exposed sections of the rain-gully, in which the hoard has been found, indicate that that the site may be containing about 1.5-2.00 m thick cultural deposit. The cultural material scattered on the surface is mainly represented by red ware dominated by well-baked thick fabric potsherds. Their core is red or grey. Some of them bear a fine slip, a few of which are applied design showing usual rope pattern. A finely marked floral pattern on the outer surface of a potsherd is worth mentioning here. The only identifiable shape represented by the potsherds is vase showing different types of rim portions. Since no other typed ceramics and shapes could be found in the preliminary exploration of this site, it appears to be representing a single culture site. As regards its chronology, in absence of dishes and other shapes associated with black slipped ware, PGW and NBPW, on comparative considerations it may be placed in pre-PGW context. The detailed investigation may reveal other aspects of the cultural assemblage of the site.

Copper Hoard

All of the artefacts of Purwa Udai Copper Hoard bear soil and copper rust. Before cleaning and preservation, the hoard collectively weighs to about 25 kg. It is consisting of the well-known artefact types, usually found in other previously discovered Copper Hoards, such as harpoon, anthropomorphic figure, flat axes, chisels and rings. Except some rings and axes most of them are broken. Their typological distribution is shown in the following table.

Table 1: Typological distribution of the artefacts: Udaipurwa-Copper Hoard

S. No.	Type of artefact	Number
1.	Barbed Spearhead (Harpoon)	01
2.	Anthropomorphic figure	01
3.	Flat axes	13
4.	Chisels	02
5.	Rings	51
6.	Small broken parts of rings	04
7.	Broken part of an arm of an anthropomorphic figure (?)	01
Total		73

The **harpoon** measures about 30 cm (maximum length) x 6.5 cm (maximum breadth) x 0.5 - 1.90 cm (minimum and maximum thickness). It is cast in a double mould. Its upper tapering blade portion forming about 2/3 of the artefact is made as a usual spearhead comprising of a prominent mid rib on dorsal and ventral surfaces (Pl.1). Its lower ends are incurved like a pointed barb. The sides are sharp but bear irregular wearing marks. Two sets of incurved barbs with circular section are jutting out from either sides of the shaft. These barbs are horizontally as broad as the upper spearhead. The lower portions of one of the upper and both the barbs of the lower set are broken. Below the barbs, at the junction of the barbed portion and the tang, is a set of about 1.00 cm thick round and blunted small knob like projection on either side. Their horizontal extent is about 1.2-1.5 cm. One of the knobs bears a prominent hole all through the section. In all probabilities, the knobs and holes have been provided for fastening the artefact with a stick or pole. The lower end of the shaft is broken. This specimen is comparable with the similar artefacts recovered earlier from Saipai (district Etawah; Lal 1971: fig. 22, no.1), Baharia (district Sahjahanpur) (*Puratattva* 1971: Pl. II), etc. The Harpoons showing a little variation in their make and size, found from different places in districts Sitapur, Hardoi, Kanpur, Unnao, etc., are kept in various museums (Wahal and Shukla 2007: 106).

Both the arms and almost lower half portions of the **anthropomorphic figure** are broken (Pl. 2). The extant height and breadth are 18 cm and 22.3 cm respectively. Its maximum thickness is about 1.2 cm. A thick regular ridge outlines the broad semi-circular head. It is 22.3 cm broad at its base. The arms are horizontally extended and slightly incurved. The surface of the figure bearing green patina shows extensive hammering marks or chevron-or herring bone patterning. Though, the lower half of the artifact is broken, typologically it may be placed under group A as classified by Kumar (2002) and is comparable with Bisauli (district Badaun), Sheorajpur (district Kanpur) (Lal 1951: 23, Pl. V, IX), etc.

A small broken portion of a copper artifact also appears a part of an arm of an anthropomorphic figurine. However, it does not fit in with either of the broken arms of the above-mentioned anthropomorph. Its extant length, breadth and thickness measure 10.5 cm (incomplete), 3.00 -1.7 cm and 0.6 cm respectively.

The **axes** comprising long tapering sides, broad hemi-spherical cutting-edge and straight butt end are of varied sizes (Pl. 3). Out of total 13 axes, only 4 are intact, rest of the artefacts are represented by their broken portions. Their length and breadth varies between 13.00 – 18.5 cm and 10.00 – 18.5 cm. However, the breadth mostly ranges between 15.00 – 15.9 cm. Their thickness measures from 0.7 – 1.2 cm. The upper and lower portions usually show a proportion of about 1.1: 1.0 and 0.9: 1.0 or vice versa in their length. The working edge of most of them is so sharp that they may be used as cutting tools even today. The butt portion is almost straight. Most of these axes are shouldered. The working edge of two tools is partly damaged, probably due to their consistent use.

One of the shouldered axes bears five circular depressions on their one surface. Three of them are vertically marked one below the other in the central portion, one such depression is marked wide apart toward the lower sides to the vertically arranged depressions (Pl. 4). This type of depressions in varying numbers, from one to sixteen, forming different patterns, have been observed on the copper axes recovered from a number of places, such as Rewari (Haryana), Bahadarabad, Kheri, Manpur, Gandhauli, Shahabad, Bithur, Kaushambi and Haswa in Uttar Pradesh (Kumar 2003a). The studies of these depressions and their probable significance have been carried out by Thaplyal and Shukla (1976) and K. Kumar (2003). These depressions are arranged in geometrical shapes including straight line, semi-circle, circle, square, rectangle, triangle, etc. However, none of the patterns illustrated by these scholars is similar to that of the shouldered copper axe of Udaipurwa Copper Hoard. According to Thaplyal and Shukla (*Op. cit*) these depressions may be representing the trade marks of different copper-smiths; may be having some bearing on the peculiarities of these tools, their size, weight, etc.; they might have some magico-religious or ritualistic significance. They have also traced the contacts of the authors of Copper Hoards with distant places on the basis of their provenance from Navdatoli and Kaytha.

The extant measurements of length, breadth, thickness and diameter of the above-mentioned axes are tabulated under Tables II and III respectively:

Table II: Measurement details of the axes

S. No.	Length	Breadth	Thickness
1.	17.5 cm	15.5 cm	0.8 cm
2.	17.5 cm	15.0 cm	0.8 cm
3.	13.5 cm	12.0 cm	1.1 cm
4.	13.0 cm	11.0 cm	0.7 cm
5	18.5 cm	15.0 cm	0.8 cm
6.	10.5 cm (broken)	13.8 cm	0.9 cm
7.	14.0 cm (broken)	15.7 cm	1.4 cm
8	14.1 cm (broken)	15.5 cm	0.9 cm
9.	16.0 cm (broken)	18.7 cm	1.2 cm
10.	09.5 cm (broken)	15.0 cm	1.1 cm
11.	06.5 cm (broken)	10.0 cm	0.7 cm
12.	Broken	Broken	0.7 cm
13.	Broken	Broken	0.8 cm

Table III: Number of artifacts (axes) according to their measurements

Length:	Nos.	Breadth:	Nos.	Thickness	Nos.
13.0	1	10.0- 10.9	1	0.7	3
13.5	1	11.0 -11.9	1	0.8	4
17.5	2	12.0 - 12.9	1	0.9	2
18.5	1	13.0 -13.9	1	1.0	
		14.0 - 14.9	-	1.1	3
		15.0 - 15.9	6	1.2	1
		18.0 –18.9	1		

Two **chisels,** included in the Udaipurwa copper hoard, are typologically different from each other (Pl.1). One of them is a complete while the upper portion of the other one is broken. The first one is broader than the other. It is 15.3 cm in length and 4.5 cm in breadth. Its thickness is 0.75 cm. The working edge is sharp and slightly semi-circular in shape. The extant length of the second specimen is 16.7 cm. It is only 2.2 cm broad. Working end is sharp and almost straight with slightly tapering sides.

As regards the numbers of the artifacts, the **rings** counting 51 are the most dominant in the Udaipurwa Copper Hoard. They are oval-circular on plan and are of different sizes (Pl. 5). Most of them show broken mouths or openings. Their average diameter ranges from 5.2 - 8.3 cm (detailed in Table IV). Their thickness varies from 0.7 – 1.7 cm, however, most of them are about 1.5 cm thick.

Table IV: Details of diameter

Diameter	Nos.
5.0 – 5.5 cm	05
5.6 – 6.0 cm	11
6.1 – 6.5 cm	13
6.6 – 7.0 cm	11
7.1 – 7.5 cm	07
7.6 – 8.0 cm	02
8.1 – 8.5 cm	02

On the consideration that these rings comprise an opening, Lal (1951, *op. cit:* 22) has observed: "that pieces of required size were cut out of a long metallic rod and subsequently turned into the shape of rings".

The rings of Udaipurwa Copper Hoard may be placed two groups: (1) with open mouth, (2) with closed mouth, and (3) interlocked with each other like a chain. First group is further dividable in two sub-groups having simple and plain circumference and thickened mouth ends, numbering 12 and 16 respectively. Second group also show above variations having same circumference and thickened mouth-ends, numbering 8 and 5 respectively. Third group includes 4 specimens, further divisible into two subgroups having two specimens each on the basis of the number of rings. First of them comprises two interlocked rings and those of second subgroup comprise three interlocked rings. Some of the specimens of first group with a comparatively broad end might have been used as ornaments.

Kumar (2003b) has classified the Indian Copper Hoard-rings into five groups and discussed their functions in detail. According to him their "more important possible uses were: (i) the personal ornaments; (ii) the 'ring money' or unstamped metallic currency; (iii) the cult or votive-objects of the Mother Goddess; and (iv) the fixtures to attach the copper plough shares (the so called 'bars') to the wooden ploughs.

Observation

Since 1822, when a copper hoard artefact was found at Bithur, about one hundred Copper Hoards have been found from different places, in western Uttar Pradesh, Haryana Rajasthan, Bihar, Madhya Pradesh and other areas. Red ware potsherds have been found on the surface of most of their find-spots. Some of them, located in Uttar Pradesh, such as Bahadarabad (District Saharanpur), Bisauli (District Badayun), Rajpur Parsu (District Bijnaur), Baharia (District Shahjahanpur), Saipai (District Etawah) (Lal 1971: *Op. cit.*), Madarpur (District Moradabad) (Sharma, *et al.* 2001-02), etc., have also been subjected to archaeological excavations. However, only at Saipai a copper-harpoon has been found in the excavation in archaeological context. Most recently at the cemetery-site at Sanauli in District Baghpat an antennae sword (an important artefact of Copper Hoard) and sheath have also been found in a grave placed with burial goods along with some of the dead bodies (Sharma, *et al.* 2005-06). That is all so far we know about their associated culture and context. In this regard, the discovery of Udaipurwa-hoard from an ancient site, containing a thick cultural deposit, is of immense significance.

We are hopeful of getting enough cultural material, charcoal and other organic remains during the archaeological excavations for radiocarbon dating and for the study of other details. With these objectives in view, the Directorate of Uttar Pradesh Archaeology Department has submitted a formal proposal for the approval of the Archaeological Survey of India, New Delhi.

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Discovery of a New Shell Inscription: A Possible Historical Link of Maitrakas from Vallabhi

The most ancient city of 'Astakapra' on the eastern coast of Gulf of Khambhat lat. 21° 35'N 72° 15E 24 km. south of Bhavnagar district (Gujarat). The Greek Astronomer Ptolemy as well as the records of 'Periplus of Erytharean Sea' refers as having a promontory on the eastern side of the peninsula Syresthrain (modern Sorath) which confounded the mouth of Namadus (Narmad) i.e. Barugaza 3000 stadia on the opposite side of the Gulf. This precise mention in the Periplus of the locality of 'Astakapra' leaves no doubt as being the same as Hathab, firstly it is just opposite Bharuch, and secondly its distance from the mouth of the Indus is just what is given by the Greek writer. It has also been satisfactorily identified with Hastakavapra, a name which occurs in a copper plate grant of Dhruvasena I of Vallabhi. The recent excavation conducted by the Author in the year 2002-03 and supported and helped it again in identifying Astakapra / Hastavapra readible from a 'Gold Signet Ring' as well as from a seal dateable to 2nd – 5th century A.D. So far the history of Vallabhi is concerned from the archaeological records dates the site from 5th century to 8th century A.D. was the capital of Maitraka rulers, the founder being Senapati Bhatraka, who were believed to be powerful rulers in Western India during this period. Similarly it flourished and was a centre of attraction to merchants, soldiers, and was a centre of learning. There is a traditional account about the origin of Shvetamabara in the city of Vallabhi, thus suggesting the importance of the city and also as the centre of Jainism.

During this period Hatabh town was the headquarter of a district as recorded in the Ganeshgad plates of Dhruvasena IV Gazetteer. While explaining the adjoining fields /areas around Hathab during course of excavation a very significant discovery was made first of its kind in Saurashtra. A sandstone oval shaped inscribed column was collected from one of the raised elevated land ½ km. from Hathab at Kharia, lying on the bank of Mahaleshwari river. It was noticed lying in the field with dust, unnoticed, but looking at it, again turned out to be 'Shell Character' dateable to 4th – 5th century AD. Now preserved in ASI Excavation Branch-V, Vadodara.

The length of the sandstone oval column is 65 cm with its one end broken. The width being 31 cm. and thickness almost 16 cm, while the reverse part is flaked and almost flat.

The writing consists of a single line well preserved running across the faces, covers a length of 48 x 30 cm, well preserved, except that a letter are flaked. The script is employed in the epigraph is Sankha, described as 'Sri Kirti Chandrasya'. The stone however does not supply much information about the name, extent or importance of the town. Therefore it should not be surprising to mention basing on the evidence of ample Chanks, Chank bangles pieces, and other ornaments collected from the excavation at Hathab suggesting Industry of manufacturing shell objects must have been existing earlier in ancient times which made them to adopt this character in shell.

It must be admitted at once that no clear record is there in either Kshatrapa or Maitraka Inscription of Maitrakas of Saurashtra except that Senapati Bhatraka (founder of Maitraka) was a Governor in Junagadh during Skandha Gupta period 5th Century AD. So far historical aspect of Maitraka dynasty is concerned, Chandralekha, a Vakataka princess and the daughter of Chandrakirti of Ujjain who is mentioned in connection with the schism in Jainism married a Vallabhi King identified by some with Dhruvsena I succeeded his elder brother king Dhronasinha (Circa 520-540 AD). The name of Dhruvasena is also associated with another important event in the history of Jainism. It is said that formerly only monks and priests were entitled to recite and listen to Kalpsutra. But the sacred work was recited before a public audience at Anandpura for consoling King Dhruvsena, who had been afflicted by the sad demise of his son. So it is possible that since Dhruvsena was associated with the public recital of Kalpsutra which he started on the eve of his son's demise, must have been given the fame by the public as 'Sri Kirti Chandrasya' if the matrimonial alliance is taken into consideration. It is his deals which made the masses to name him 'Kirti Chandrasya' and secondly Hastavapra (Hathab) is not far from the capital of Vallabhipur (Maitraka dynasty) which was the head quarter of the Maitraka dominion.

The inscription is historically quite significant as firstly it throws light on the socio-religious activities under the Maitraka reign, secondly it is the first record of this monarch and thirdly it confirms the extension of their sway as far as Ujjain in the east as known from the copper plates and finally for the first time in Saurashtra the Chank inscription is found.

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Archaeological Survey of India

Shubhra Pramanik

An Upper Palaeolithic Site at Ellora, District Aurangabad, Maharashtra

Ellora being a World Heritage site is known for its rock cut caves. But very little is known so far about its Stone Age history. Apart from some casual references to the Ellora stone tools by Codrington and Col. Gordon, the first investigation was carried out by Soundara Rajan (Soundara Rajan and Sen Gupta 1962: 67-76) in the area as early as 1962. His investigation was confined to Velganga nullah in front of the rock cut caves, which is about 2 km north of the Upper Palaeolithic site that is being reported in this paper. Soundara Rajan's study in the area is based on a surface collection, who identifies three succession industries as 'Late Middle Stone Age industry', 'pure microlithic industry of Late Stone Age' and 'Proto-historic industry'. The artefacts belonging to Late Middle Stone Age industry is on jasper, pure microlithic industry of Late Stone Age is on jasper and chalcedony, whereas the Proto-historic industry is mostly on chalcedony. Subsequently, few stray microliths comprising blades, lunates, points etc. made on chalcedony were also reported from the area by Ajit Kumar and M.Mahadevaiah (IAR 1984-85: 149). The present site at Ellora was reported first by R.S.Thakur in 1993 (IAR 1993-94: 79) that was subsequently studied by the first author and the faunal remains by the second and third authors.

The Site

The present Upper Palaeolithic site (75° 10' 39" E : 20° 0' 41" N) at Ellora lies about 1.75 km south of main rock-cut cave complex and about 0.5 km away from the left side of Khuldabad – Ellora road. As the site is located at the pediment surface of the hill range, it gently slopes towards the west (Fig.1). A small stream locally known as Telban *nullah*, which is a tributary of Velganga *nullah* flows almost touching the southern periphery of the site. The Telban *nullah* after originating, drops as waterfall from a steep cliff on the south-east of the site at a distance of about 1.0 km and then gently flows towards north-west and finally joins Velganga *nullah*. Though this *nullah* has become seasonal due to deforestation in recent years, but one can very well imagine its perennial nature when the Ellora hills were covered with good vegetation. Moreover, the area being of Deccan Trap has the nature of water retaining capacity. Therefore, in spite of so much deforestation in recent years, even today one can see water remains in the *nullah* bed almost throughout the year in the form of water pools near the site except the hot months, i.e. April-July.

A large number of artefacts in the form of surface scatter were noticed here covering an area of about 5,000 square metres mostly confined to the left bank of Telban *nullah*. The site is badly disturbed and the artefacts are exposed to the surface due to recent cultivation, soil erosion and earth quarrying activities. The portion of the site close to the stream is badly destroyed due to earth quarrying activities from where faunal remains and ostrich egg shell pieces have been collected. Besides

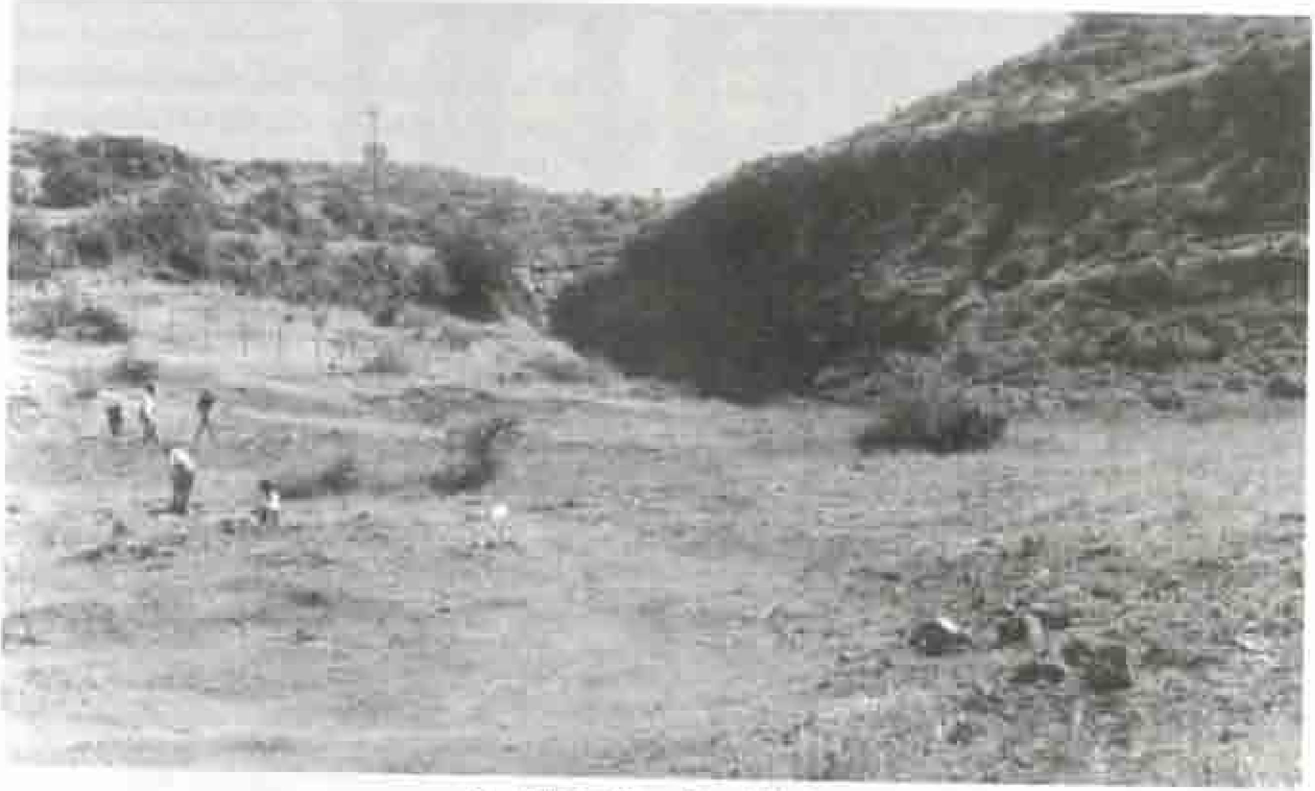

Fig. 1: Ellora: Upper Palaeolithic site

the concentration of artefacts at the site, it has been noticed that artefacts in lesser quantity do occur almost throughout the valley close to the pediment surface. On the basis of taphonomical observations of the artefacts and faunal remains, and also composition of the assemblage, the site seems to be of primary in nature.

Stratigraphy

The stratigraphical context of the artefacts is the older alluvium of Terminal Pleistocene period, which is characterised by compact yellowish silt with *kankar* nodules. The artefacts seem to occur throughout this deposit. The thickness of older alluvium has a differential deposit depending on the undulating surface of the Deccan trap.

The artefacts seem to occur throughout this deposit, whereas faunal remains are mostly confined to the bottom horizon of the deposit. However, it is suggested that excavation in future can only ascertain the exact contextual horizon of both the lithic artefacts and faunal remains in this deposit.

The Assemblage

On the basis of the typo-technological features of the artefacts it is clear that the assemblage belongs to the Upper Palaeolithic cultural phase. The assemblage (Fig. 2 and Fig. 3) comprises backed blades, points, lunates and scrapers and simple artefacts such as blades, blade cores, flakes, flake cores, etc. The noteworthy feature is that the scrapers, flakes and flake cores component of this assemblage are bigger in size and look almost similar with that of the Middle Palaeolithic assemblage.

The blade artefacts are mostly fabricated on chalcedony and few are on jasper, whereas the bigger size artefacts are on jasper. Certainly this variation in the use of raw materials cannot be considered as preference for raw materials during different successive cultural periods as thought earlier (Soundara Rajan and Sen Gupta 1962). Both chalcedony and jasper nodules are found in abundance locally in the form of veins and pockets in Deccan Trap. The jasper nodules mostly green in colour occur comparatively much bigger in size than chalcedony nodules. Probably this could be reason why the bigger size artefacts are fabricated on jasper.

Apart from these, hammer stones have also been noticed at the site. These well rounded hammer stones are certainly brought from a far of distance as these are not available at the site.

Faunal Remains

The faunal remains that have been collected from this Upper Palaeolithic site comprise both animal bones (Fig. 4) and ostrich egg shell pieces (Fig.5). The animal bone fragments (n=9; weight 260 gm) were taken to the Deccan College for examination. Besides a relative dating has been attempted through Fluorine-Phosphate ratio (Kshirsagar 1993) of some of these faunal materials.

Analysis of Faunal Material

Out of nine fragments, five belonged to *Bos* sp. These include fragment of a mandible with a broken molar (ELR 03), a fragmentary upper molar (ELR 05), fragment of maxillary third molar (ELR 06), shaft portion of metapodium (ELR 08) and distal end of first

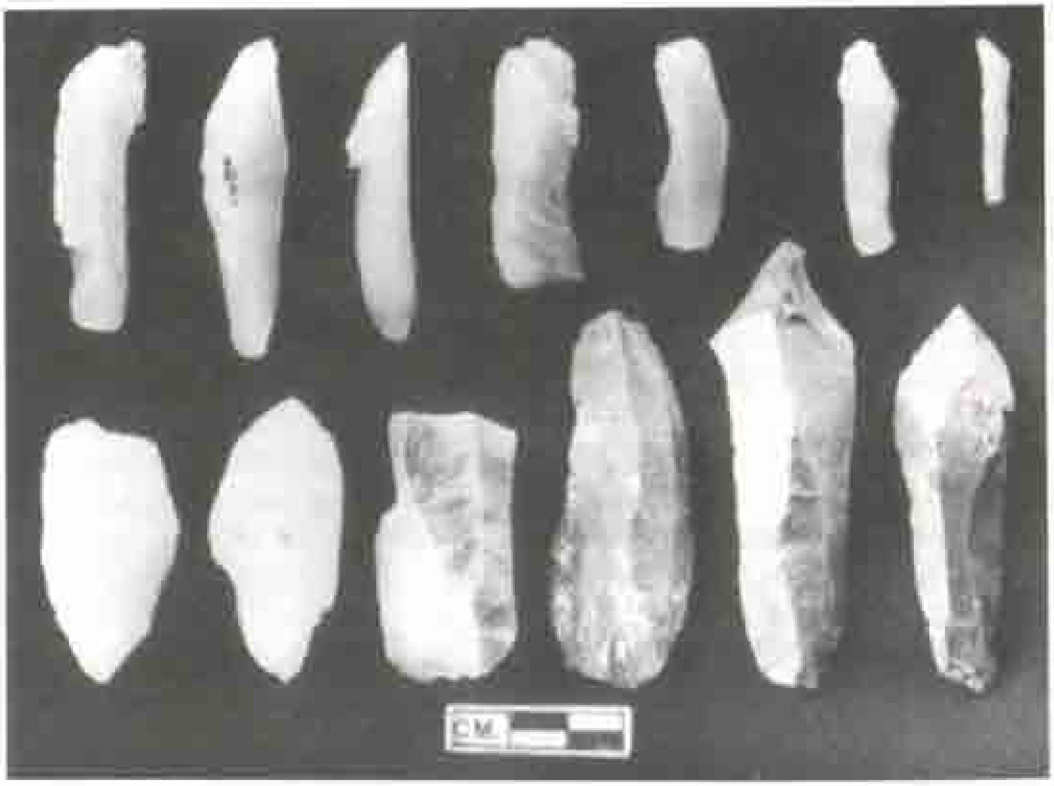

Fig. 2: Ellora: Upper Palaeolithic Artefacts

phalanx (ELR 09). From these fragments it is clear that these belonged to adult animals and represent parts of food refuse. All the skeletal elements are devoid of any patina and weathering marks. In almost all the cases, the edges of the fragments are sharp and the fragments look fresh. Cut marks have been observed in case of a couple of fragments indicating that these were associated with human occupation.

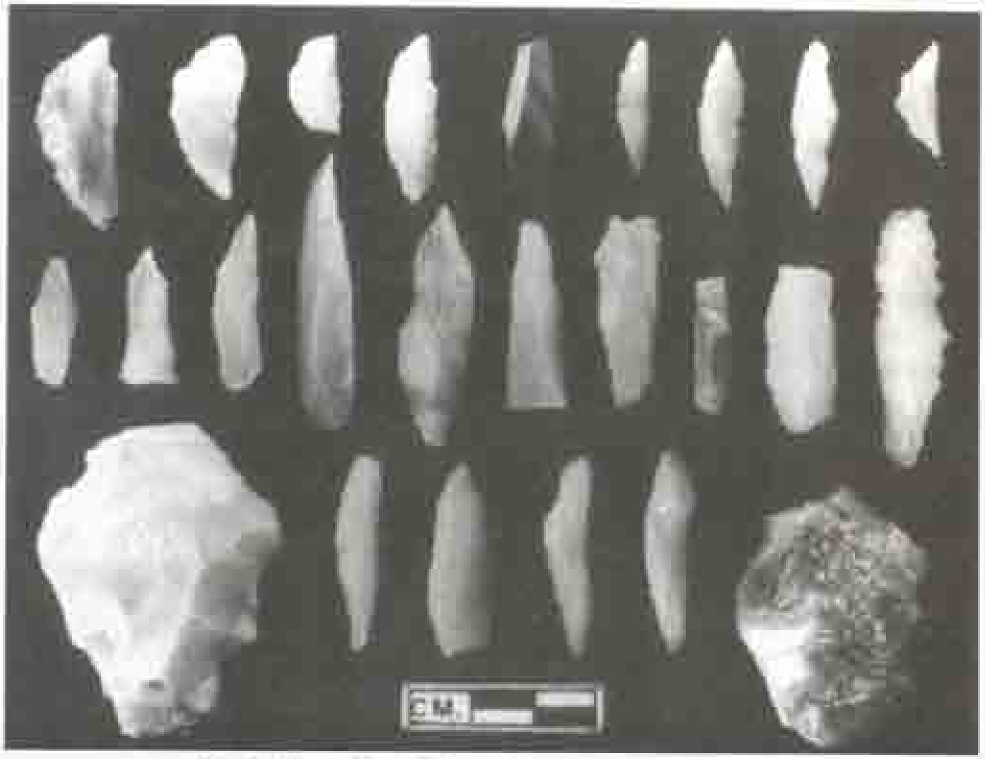

Fig. 3: Ellora: Upper Palaeolithic artefacts

This small collection has two deer species – Sambar (*Cervus* sp.) and the spotted deer (*Axis axis*). The Sambar is represented by fragment of mandible (ELR 01) with a complete second molar tooth (L=20.60 and W=10.30 mm). A single fragment of the spotted deer examined was of the mandible with all the teeth in fairly worn out condition (ELR 02). Perhaps this mandible came from a stag of very old age. One isolated maxillary second molar (ELR 07) of the right side (L=15.38 and W=11.00 mm) of a blackbuck (*Antilope cervicapra*) indicated that the animal was as old as 6-8 years.

A single fragment of an equid tooth (ELR 04) could be identified as that of maxillary second molar. The edges of this *Equus* sp. fragment are rolled and damaged, perhaps due to physical displacement from its depositional context.

Fluorine-Phosphate Ratio

Two fragments (ELR 2 and ELR 8) were subjected to a relative dating analysis based on the Fluorine-Phosphate ratio (Table 1). In absence of more secure radiocarbon method, the Fluorine-Phosphate ratio method allows one to place the animal fossils in a relative time frame (Kshirsagar 1993). The ratios revealed that the sample of spotted deer bone (Lab. No. 453) belonged to the Upper Palaeolithic/Terminal Pleistocene, whereas the sample of metapodial shaft of the *Bos* sp. (Lab. No. 452) is datable to the Mid-Holocene.

Table - 1

Lab. No.	% F	% P	% P_2O_5	$100F/P_2O_5$
452	0.294	10.73	24.62	1.19
453	0.972	10.31	23.61	4.12

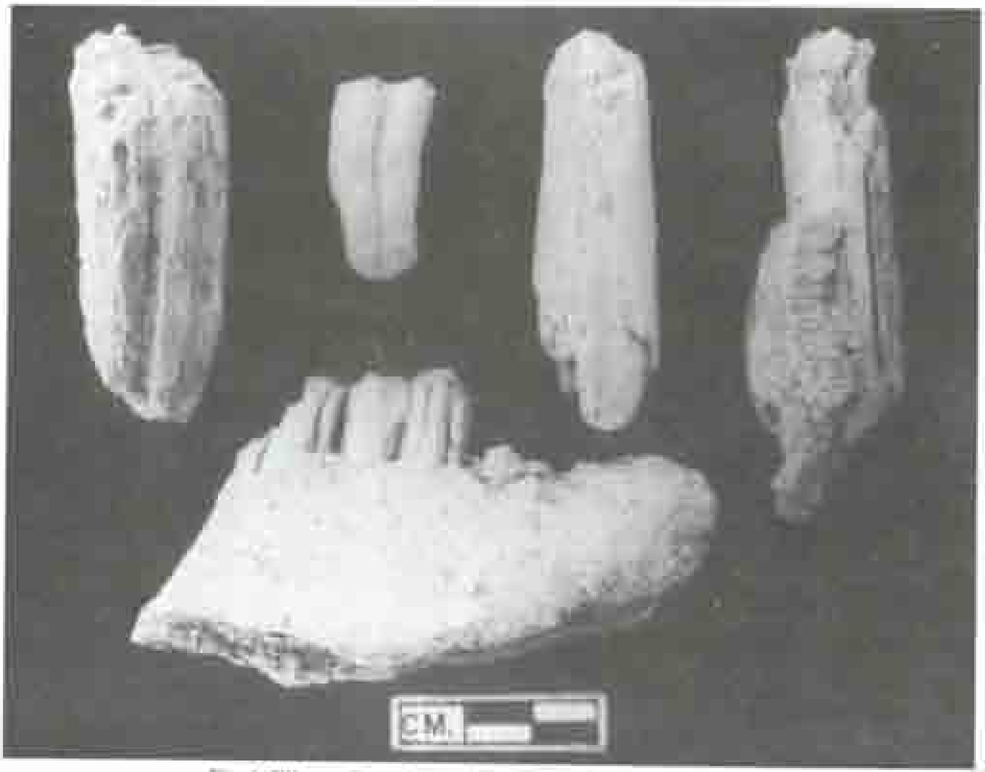

Fig.4: Ellora: Faunal remains – Top left: *Equus* sp. tooth.
Top: second to fourth *Bos* sp. Dental elements. Bottom: Mandible of *Bos* sp.

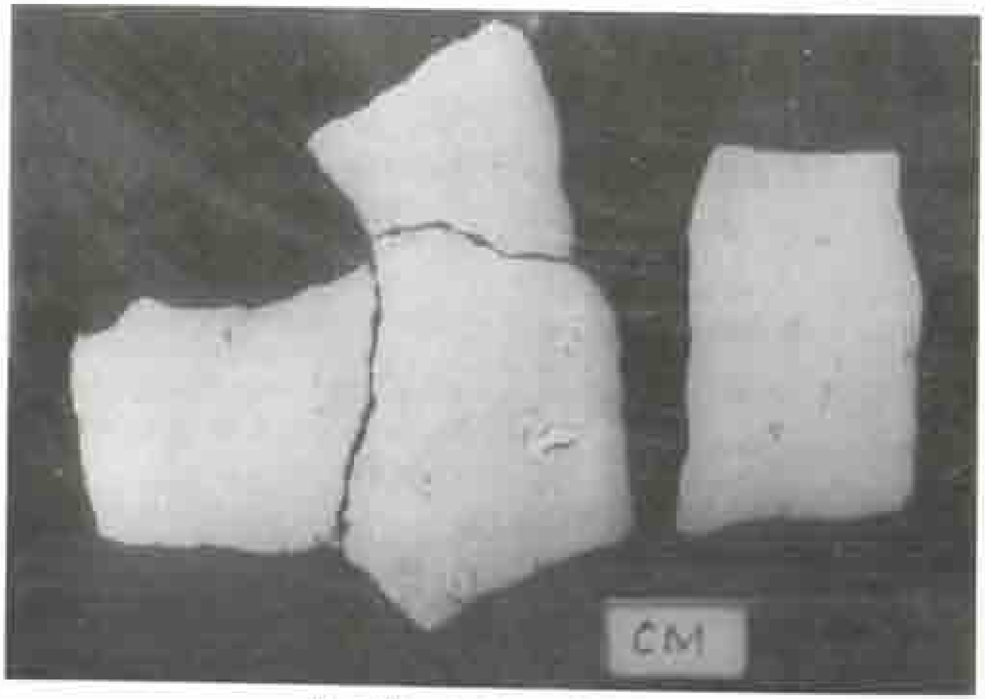

Fig. 5: Ellora-Ostrich egg-shell pieces

Discussion

As discussed earlier the larger size artefact component of the assemblage if seen in isolation, it characterizes the Middle Palaeolithic industry. However, the scattering pattern of these artefacts in the area confirms that both these elements co-exist. This was probably misunderstood by Soundara Rajan, who reported this heavier component of artefacts as ascribed to Late Middle Stone Age industry. Further in the absence of understanding of Upper Palaeolithic industry then, he also assigned the microlithic industry at Ellora to Late Stone Age.

The field observations made on the artefacts during the exploration and the analysis of the animal skeletal remains reveal that except the equid tooth most of the artefacts and ecofacts are in the primary context. Although only nine animal bone fragments were available for examination, these revealed that the Upper Palaeolithic people have used wide spectrum of animal species such the deer, bovines, equids and the antelopes including ostrich eggs.

To conclude the highlights of the present discovery which is of three fold –

(a) The present investigation modifies the earlier notion of three fold cultural succession and establishes the existence of Upper Palaeolithic industry in the area.

(b) It is one of the few Upper Palaeolithic sites reported in the country where faunal remains occur in association with artefacts in a primary context.

(c) Ellora now finds the place on the map of ostrich egg shell find sites of India.

Acknowledgements

This investigation was carried out in November 1993 by the Prehistory Branch of Archaeological Survey of India. The first author is thankful to R.K.Dwivedi, N.K.Nimje and P.V.Janardhanan of the Prehistory Branch who were associated in the present investigation. The photographs used are due to courtesy of the Archaeological Survey of India.

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BOOK REVIEWS

Chakrabarti, Dilip K. 2006. ***The Oxford Companions to Indian Archaeology; The Archaeological foundations of Ancient India,*** Oxford University Press, New Delhi, pp 570; Price Rs. 2250.00

This is a book about the archaeological foundations of Ancient India from the thematic, geographic and temporal angle. The author has dealt with the subject area-wise and phase-wise covering the distinctive features of regional developments in the Indian subcontinent. It is divided into 25 chapters with appendices, bibliography and index and is illustrated with photographs, figures and maps. To attempt such a comprehensive book, Chakrabarti has used his background of writing on 'History of Indian Archaeology from the Beginning to 1947' (1988), The Archaeology of Ancient Cities" (1995) and "India-An Archaeological History (1999), which provided him with a basic depth in understanding the cultural phases .He has also worked earlier on ancient Indian trade routes and revisited old explored sites.

In the first 6 Chapters he has dealt with hominid fossils and the current theme of human evolution through Paleolithic, Mesolithic and beginning of food production in India. In these chapters he has tried to build up the earlier Soan Valley sequence of the H.de Terra and Paterson which was applicable to Himalayan and sub-Himalayan areas. He has covered Delhi, Haryana, Rajasthan and also stone age sequence of the Sabarmati Valley of Gujarat and Narbada valley of Madhya Pradesh. The southern part of India has also found its due place. While dealing with Paleolithic India which covers only small geographical segments on the chronology of the various Paleolithic levels, the Mesolithic evidence is not free from problem and presents possibly nothing more thasn the persistence of hunting-gathering tradition. He has discussed how the beginning of food production in India took place from Mehargarh onwards.

From Chapter 7 to Chapter 11, the growth of villages from Baluchistan to western Uttar Pradesh and Gujarat through the beginning of Chalcolithic and Harappan cultures *i.e.* Early, Mature and Late Harappan have been discussed.The establishment of the first settlements in the Indus-Hakra-Ghaggar alluvium were highlighted from the point of origin and chronology of the Harappan Civilization. Chapters 12 and 13 are important as they deal with the rice cultivation in Ganga plain and also Neolithic cultures of India. The knowledge of bronze was there in a host of so called Neolithic-Chalcolithic cultures. Chapter 14 to 17 gives a survey of the beginning of iron in India and also about the establishment of early historic cities in the Indo-Gangetic alluvial plain from Assam and Bengal to Sind. The next chapter deals with the material basis of life - the settlements, technology, agricultures, trade and trade routes.

Chapter 19 to 24 deal with art and architecture, technology, trade, inscriptions, coins, temples, monasteries and paintings. The last chapter gives a general perspective of Indian art and archaeology. The appendices include archaeology of Andaman & Nicobar Islands and Lakshdweep.

As rightly remarked by the author, the work attempts to highlight the interconnection between regional geographies and archaeological and historical issues. He has also given his observation on many vital issues such as the relationship of Neolithic and Chalcolithic cultures outside the Harappan distribution area and also between Pre/Early/Mature/Late Harappan on the one hand and the advance hunter-gatherers in the Ganga Valley and further east on the other.

The beginning of rice cultivation in the Ganga plain has been discussed in detail. Started from the context of Koldihwa which provided a continuity from Neolithic to Iron Age, the recent data from Lohuradeva area accompanied by studies of geomorphology, pollen records, phytoliths, diatom and micro-charcoal indicate well developed agriculture in the area in the 7th-6th millennia B. C.

The foundation of early historic India is rooted in its Neolithic or still earlier crop history. The archaeo-zoological situation has always been dominated by cattle and buffalo of selective breed. This was also the time when the whole of the sub-continent was being integrated into one inter-act sphere. However, there is no uniform date of the beginning of historic period in India. The analysis of historical material like inscriptions, coins, art and architecture presented a bird's eye view on the social and economic aspects of ancient India.

The author has handled this vast field data, systematically including geomorphology and climatic conditions of the regions. He has also discussed the evolution of settlements based on the same. The Appendix on the archaeology of Andaman and Nicobar islands is a welcome addition.

The work, which is of scholarly nature, well classified and illustrated deserves our compliments. Being the latest in the series, it will go a long way amongst the students and will be useful to scholars and researchers interested in Indian archaeology.

K.N.Dikshit

Tripathi Alok (Ed) 2007 *India and the Eastern Seas,* Agam Kala Prakashan, New Delhi, pp 284, figures 22.16. Price 2500.00

The Book 'India and the Eastern Seas' is an outcome of an International Seminar on Marine Archaeology (ISMA- 2) held in New Delhi from 18th – 19th March 2005. It was jointly organized by Indian Navy and Archaeological Survey of India (ASI). The seminar was attended by scholars and experts in the field besides a large number of observers from both the organisations as well as other related field of expertise. Keynote address was delivered by C. Babu Rajeev, the then Director General of ASI while inaugural address was given by Admiral Arjun Prakash, Chief of the Naval Staff, Indian Navy. There were twenty two papers presented in the seminar and those are included in the present publication edited by Alok Tripathi, Superintending Archaeologist, Underwater Archaeology wing of ASI.

The papers contributed by eminent scholar contain recent information on archaeological find on the coasts of Bengal, Orissa, Andhra and Tamil Nadu. It also contains research papers about the recent advances made in others countries of the Eastern Seas. Extensive explorations on the coast and offshore and onshore excavations at Mahabalipuram in the Bay of Bengal have generated data of scientific and cultural value for the scientific study of shoreline changes and their effect on the coastal monuments. Data and extensive bibliography on Portuguese shipwrecks in Indian waters; French maritime activities in the Bay of Bengal; underwater activities in Sri Lanka, Malaysia, Cambodia, and Japan; re-construction of ancient Borobudur ship and her voyage, as experimental archaeology and computation of ancient ships makes this volume more useful for all those interested in diverse aspects of underwater archaeology and maritime heritage.

Profusely illustrated with photographs, including underwater and aerial photographs, line drawings and maps, this book embodied the latest researches in marine archaeology in India and in the Eastern Seas and will fascinate not only the scholars and serious students but also the common readers.

It is noteworthy that Alok Tripathi has not only marked his ability in exploring underwater sites in Indian seas but also has created a niche in the scholarly field of world marine archaeology. He deserves our congratulations.

S.S. Biswas

Sharma, D. P. 2007. *Harappan Art.* Sharda Publishing House, Delhi, pp 324, plate- 271, Fig. 271, Map-26. Price 3900.00

From 2,668 discovered Harappan sites, from India and Pakistan a large repository of art object has come to light. The present volume is an elaborate document of such art objects found from this vast area spread over 1.6 million sq. km. Art pieces in stone, bronze or terracotta along with jwellery items, pottery and seal has found their space in this meticulous study.

In the introductory chapter, salient features of the culture have been touched in brief, along with all its preliminaries like nomenclature, discovery, extent, chronology etc.

Chapter two is an exhaustive undertaking of stone sculptures. Although a complete stone image has yet to be found from Indian Harappan context, but some rare sculptural pieces along with catalogue data of sixteen images are dealt with in this chapter. Along with famous stone statuettes, some lesser known figures also found their due space here.

Some rare bronze and copper art samples housed in different museums of India and abroad are delineated in chapter three. Along with documentation an attempt has been made to trace the racial character of Harappan people in human representation in art motifs. Large number of gold, silver, copper, stone, ivory as well as terracotta ornaments found from Early, Mature and Late Harappan sites are described in the next chapter. Along with jwellery, some vessels are also documented.

An impressive description of glyptic art is the subject matter of chapter five. Negative impression of script and motif are engraved on the seals and sealings. Besides Harappan evidence relevant seals from neighbouring area are also touched. A handful collection of terracotta objects are listed in the sixth chapter. It includes large variety of female figurine along with male, animal and miscellaneous miniatures replicas. Large varieties of pottery of Harappan Civilization are compiled here location-wise as well as period wise. Typological analysis is also undertaken.

This monograph on Harappan civilization, though extensively studied and reported earlier, still appreciation is due to the author for the painstaking effort of bringing together the whole range of artistic treasure of this great civilization in detail. The photographic illustration suffers from repetition in the form of figures and plates. It will enlighten scholars as well as amateurs, interested in this subject.

Mukta Raut Dey

Bachchan Kumar.*The Buddhist Art: Vietnamese Perspectives.2007* xiv+177p., Maps, Plates, References, Bibliography, Annexure, Index, 29cm. 1st ed. B.R. Publishing Corporation. Price Rs. 2000.00

The book is a study on the Buddhist art in Vietnam. It also discusses the religious lifestyle of Vietnamese in general and cites numerous examples of Buddhist art scattered around the country. The book is divided into eight chapters.

The first chapter explains the ethnic composition of Vietnam to set the background for the rest of the book. It goes to the extent of describing the various ethnic groups in Vietnam, their traditions and worship methods. The second chapter follows, explaining the historical background of Vietnam. It starts with references to the political scenario in Vietnam in 214 BC and goes on to explain the struggle of Vietnam under various dynasties of rulers like T'ang, Ngo, Dinh, Le, Ly,Tran. It further explains about the times of Ganaraja, Pandurga, Bhrigu and Harivarman dynasties followed by Mongol invasions. A rather short third chapter provides insights into the non Buddhist religions practiced in Vietnam. It discusses the complexities of religious practices in present day Vietnam. An attempt has been made to explain the concepts of Confucianism, Taoism and their effects on this country. It further goes on to explain about the Cao Dai and Hoa Hao movements.

Fourth chapter begins discussing the development of Buddhism in Vietnam in detail. It begins with the reference to Asoka and proceeds with the visits of various monks. It further explains the various sects formed with the passage of time, various external influences on Vietnamese Buddhism and its fate under various dynasties. The chapter is full of anecdotes and makes quite an interesting read. The fifth chapter discusses the prehistoric roots of Buddhism. It begins right from the Palaeolithic and Neolithic examples of art forms found in Vietnam and goes on to illustrating the lives and times of Vietnamese people based such evidence from various times.

Chapters six, seven and eight focus on the Buddhist art forms by the Viets, Chams and other minor forms respectively. The coverage of these three chapters is quite impressive. They take into account the Buddhist architecture, paintings, sculptures, garments, ornaments etc. of various time periods for the above mentioned ethnic groups.

Ninth and the final chapter conclude the study, followed by bibliography, annexure and index. The list of illustrations had been given in the beginning of the book. 72 images at the end, support the text. The obvious amount of hard work that has gone into framing this book itself is worthy of praise. The book is a good read for those interested in the subject.

Asha Joshi

Sharma, D.V 2007 ***Archaeology of Fatehpur Sikri*****,** Aryan Book International, New Delhi, pp 183, Plate 468, Figure 18, Map 41, Price Rs.3500.00

Fatehpur Sikri lies 36 km. west of Agra wherein Akbar (1556 – 1605), the Great Mughal established his second capital, which still stands with its past glory. During my tenure (1983-85) at Agra as Superintending Archaeologist, then Northern Circle of Archaeological Survey of India (ASI), I spent days and nights at Fatehpur Sikri, roamed through the corridors of its magnificent buildings and had been thrilled having my luck being in-charge of this great city. Frankly speaking, I then never thought that Fatehpur Sikri has had such a long and continuous history of bygone ages as has now been revealed in the present work by D.V. Sharma.

Fatehpur Sikri shall always be remembered for Akbar's manifold achievements. The emperor's main attraction to this place was its association with Sheikh Salim Chishti who, he felt, blessed him with a long sought heir, the son who later became the emperor Jahangir. There were all round architectural activities. He constructed 'Jama Masjid' within a grand complex with broad flights of steps, a majestic gateway know as 'Buland Darwaza' and in its courtyard the tomb of Sheik Salim Chisti, a gem of architecture in marbel. Besides, there are innumerable architectural edifices in the Darbar and Palace complex such as *Diwani – i - Khas, Diwani – i – Am* with its central pillar, *Panch Mahal*, Jodhabai's palace, Jahangiri Mahal etc. In fact if we close our eyes and visualize Fatehpur Sikri we find only architecture par excellence in red sandstone all around us.

It is from here Akbar also proclaimed a Faith *Din – I – Ilahi* (A religion of God) in 1582 a synthesis of all religions of the world. He established 'Ibadat – Khanah' where philosophers of all religions met and had discourses in presence of the Emperor who also took active part in it.

Beyond these, one could not think much of Fatehpur Sikri as a commoner. R. Nath, a noted art historian specially on Mughal art and architecture visualized this fact and observed in his work Fatehpur Sikri and its Monuments (*Agra* 1999) that ' Archaeology of the Fatehpur Sikri, which though an extremely difficult and arduous subject can be undertaken by and intelligent, energetic and sincere archaeologist who is extremely dedicated to field work'. D. V. Sharma, a true disciple of R. Nath, has risen to the occasion to fulfill the dream of his Guru and hence this monograph.

R. C. Gaur of Aligarh Muslim University in collaboration with ASI, Agra Circle conducted excavations (1978- 1988) at Fatehpur Sikri to seek answers to the questions; 'What was the original boundary of palace area and where was the habitational area of the construction labourers'. 'The objective of our excavations was to unravel the ruined structure at Fatehpur Sikri buried under debris', he noted in his final report (New Delhi 2000). What a colossal wastage for a National Project! Further explorations and excavations have been conducted by ASI from time to time the results are yet to be studied scientifically. However, Sharma during his tenure as Superintending Archaeologist of the Agra Circle with his natural enthusiasm and scientific pursuit conducted exploration of the region and excavation at Bir – Chhabili Tila at Sikri (1999-2000). This yielded the desired results which push back the history of Fatehpur Sikri to a hoary past of pre-historic era with a unbroken sequence of historical events till modern times. The present monograph is thus the result of author's pursuits to discover the past history, the Archaeology of Fatehpur Sikri which is so exciting from the illustration of a recently excavated image of Jain Saraswati on the cover page of the book 'Archaeology of Fatehpur Sikri'. It is one of the most comprehensive accounts throwing new lights on the Archaeology of the region.

The study has been arranged in 10 chapters. In the first chapter a graphic description of the 'Terrain' Physical Features and 'Water' system of the region have been provided while in the Second Chapter findings of the exploration of ASI, such as ancient temple remains sculptures and other antiquities has been described. The results of the excavation at Bir- Chhabili Tila have been devoted in Chapter Three to five. Every detail has been studied in details and described in full, giving special reference to the newly discovered temple remains, pottery sculptures, inscription (10th – 11th Centuries A.D) and other antiquities. Chapter six deals with 'Medieval Archaeology' (from 10th – 16th Century A.D). Archaeology of Akbar's Fatehpur Sikri has been studied in depth in Chapters seven to ten. The last chapter deals with retrospect and conclusion of the study. The volume is profusely illustrated with good black and white colour photographs as well as appropriate drawing at places. The book is indeed a bold attempt of D.V. Sharma in describing the facts that he believes to be true. Some remarks in the book at places appear to be provocative, however, that should instigate further discussion and debate about one of the most dynamic and exciting periods in medieval history. With strong supportive evidences the book is well written, a valuable addition to the scholarly studies. The book is very well produced for which credit goes to M/s Aryan Book International, New Delhi.

S.S. Biswas

Ali, Rahman, Ashok Trivedi and Dhirendra Solanki, 2004. *Chalcolithic Site of Ujjain Region:Mahidpur (Excavation Report)*, Sharda Publishing House, Delhi, pp.125 including Appendix and Index, Plates 53. Price Rs.1100.00

The present book is a comprehensive report of excavations conducted by the authors at the chalcolithic site of Mahidpur, Dist. Ujjain on the bank of Shipra river during three seasons i.e. 1986-87, 1989-90 and 1998-99. These excavations have yielded greater evidences about the chalcolithic culture of Malwa. It is likely that a separate ethnic group of later Harappans or Ahar culture reached at the site in the first phase and setteled here over the surface of the black cotton soil on the bank of river shipra. The site had been occupied by these people for a long span of time of nearly four thousand years in spite of twice heavy floods and destruction by the severe fire. The material remains unearthed from the excavations focuses ample light over different aspects of chalcolithic culture. The material remains of the excavations have been analyzed scientifically into eight chapters starting from introduction of the site in brief and the cultural sequence revealed as chapter I. Chapter II deals with geographical and Historical background of the region and is followed by the chapter III on strata and the different structures identified in the excavations. This gives an idea of the settlement pattern and the types of houses built by the chalcolithic people at the site.

The next chapter i.e. chapter IV deals extensively and comprehensively about the various types of potteries found in excavation during different periods. The authors have classified all the potteries into six major groups namely-Black and Red Ware, Grey Ware/ Coarse Red Ware, Red Slipped Ware, Painted Malwa Ware, Black Slipped Ware and Tan Coloured Pottery. These major groups of potteries comprise further sub-varieties in fabrics and shapes of vessels and even in shades which have been discussed in detail under different headings in this chapter. Chapter V of the book is fully devoted on the Blade Industry. The large number of microliths collected in the excavation from all the phases of Chalcolithic Mahidpur have been analyzed beautifully in this chapter in the forms of tables. Some of the selected blades and cores have also been described in detail.

Chapter VI of the book deals with the terracotta figurines and other terracotta objects such as- ear discs, studs, stopper, rings, bangles, beads etc. obtained from the excavation at Mahidpur. Chapter VII deals with the bone objects like bone points, shell bangles, saddle querns, pestles, mullers etc.The metal objects like copper bangles, iron objects and the gold objects collected in excavations have also been discussed in this chapter. Chapter VIII of the book gives the introduction of the site and excavation carried out there in a nutshell. This chapter is followed by an appendix on faunal remains collected from the excavation at Mahidpur.

With a number of illustrations, figures and line drawings and photographs of antiquities this book certainly has great research value with particular to the study of settlement pattern in Malwa region. The present book may also be accepted as an important source to understand the Chalcolithic Culture of Malwa in particular and India as a whole.

Vinay Kumar

Ray, Himanshu Prabha 2008 *Colonial Archaeology of South Asia - the Legacy of Sir Mortimer Wheeler*, Oxford University Press, New Delhi, pp 291; Price Rs.650.00

The present book on Colonial Archaeology in South Asia has been written as a tribute to or Legacy of Sir Mortimer Wheeler. The author has argued that the practice of archaeology in the sub-continent became a part of scientific displine in due course and was in fact modeled on the lines of imperialism. The book is divided into nine chapters with references and index. With the background of James Princep and Asiatic Society of Bengal and Presidential address of Mortimer Wheeler Colonial Archaeology—the practice and institutionalization of the discipline of archaeology under British Rule was presented as a safeguard of archaeological heritage in British territories. Chapters 1 and 2 are devoted to the agenda, associates and methodology, whereas chapter 3 is on the Conservation policy of the Government as in the 19th century this aspect was looked after by the State governments. The Ancient Monuments Preservation Act which was passed in 1904 was a real contribution to safeguard the monuments and archaeological sites in the colonial period. In chapter 4, the establishment of museums in India from Calcutta to Bombay and the coming up of the National Museum, New Delhi as post independence surge of nationalism are mentioned. In chapter 5 on Indus Civilization, author has highlighted that Wheeler was pioneer for modern archaeological excavation methods at Harappa and other places. The chapter 6 deals with the Chronology of Megaliths in India and Roman trade contacts with India. Chapter 8 and 9 discuss Indian archaeology in wider context and the Wheeler's legacy in the post independence India.

Wheeler was an outstanding archaeologist who always looked towards west in the cultural making of the sub-continent and constructed theories like Aryan invasion in India from the skeletons of different levels at Harappa which was outright condemned by Dales and others. The facts brought out by author only confirmed the Britisher's attitude towards their colonial territories. I am to admit that the book has not revealed anything but outright condemnation of Indian colleagues of Britishers at that time whereas the fact remained that persons like D.R. Sahani, N.G. Majumdar, K.N. Dikshit, V.S. Vats and others contributed in their own way about the progress of present day archaeology in the sub-continent.

The state monopoly on archaeology in some way passed in the hands of Indian Universities but how much they have succeeded in encouraging research is anybody's guess. Even some universities do not teach archaeology although they indulge in it. This is the present scenario. The establishment of School of Archaeology in 1959 now Institute of Archaeology, has filled up the vacuum, but students coming out do not get appropriate jobs.

The book which is well produced will be useful to scholars and teachers.

K.N. Dikshit

Tripathy, Alok 2007, *The Ancient Monuments and Archaeological Sites and Remains Act, 1958(AMSR Act, 1958)*, Sandeep Prakashan, New Delhi, pp.233

The book entitled 'The Ancient Monuments and Archaeological Sites and Remains Act, 1958' (AMSR Act, 1958) is a good compilation with the introduction and comments by Alok Tripathi. It is indeed a welcome addition in this kind of attempt first being 'Museums and Protection of monuments and Antiquities in India', H. Sarkar, New Delhi 1981 and second 'Protecting the Cultural heritage', S. S. Biswas, New Delhi 1999. Tripathi however has focused our attention to a particular Act and Rules with updated amendments which are more comprehensive. In part-I, the author has dealt the brief history of the legislations dealing with the cultural heritage in the country. This should have been little more elaborate to understand the present act (AMSR Act 1958) against the back drop of other legislations in this regard specially the Ancient Monuments Preservation Act, 1904. This Act has not been repealed although AMSR Act, 1958 was passed to make it more broad based. Besides in this part author has introduced about '150 frequently asked questions (FAQ)' which will make better understanding of various relevant issues for the readers without going through the Act and Rules.

Through the passage of time Act and Rules need to be amended due to various urgent and pressing requirements of the people as well as society as a whole. Part-II of the book deals with all these amendments in detail so that they could be related with the original Act and Rules whenever need be. Part-III on the other hand contains the Act and Rules, amendments, notifications and corrigendum in original with full references. It is gratifying to note that all the actions taken under the act are compiled at one place with great accuracy.

Since there has been no comprehensive publication which provides the authentic text of the Act (AMSR Act, 1958) along with various notifications and orders issued under the Act and Rules, this volume is important and handy to understand the various provisions of the Act and Rules. Alok Tripathi deserves our congratulations to bring out this publication which has been a long felt necessity in the changing scenario of our social accountability in all respects.

S.S.Biswas

Choudhary, D. Kiran Kranth and C. Udayalakshmi. 2006 *Ramayana in Indian Art and Epigraphy*, Harman Publishing House, New Delhi. First Edition, pp. 40, 95 plates, Price Rs. 1400.00

Till date Ramayana has been read and understood in the literary sense. The book tries to shed some light on the effect of literature on the depiction of Ramayana in temples of ancient period. The book has tried to present a holistic view of the Ramayana by incorporating various versions of the epic, including folk themes in Tamil, Telegu and Kanadda epigraphs besides the Valmiki Ramayana as a part of the study. These regional Ramayana texts help us to generate a better understanding of the impact of narration on the temple sculptures. The book is divided into five broad chapters.

Chapter one deals with introduction on the intricacies of narrative art and Andhra art in particular. It explains the narratives found on the temples of Andhra and compares them to the panels found elsewhere. It also gives a brief description of how with time the depiction of the epic on temple walls changed.

Chapter two studies the impact of Vaishnavism on the Indian religious life, which is the belief in Vishnu, the Supreme Being. It further explores Vaishnavism in context of Vasudeva, Narayana and tries to draw conclusions on the evolution of Mahabharata and Bhagvata. Liberal amount of examples have been given to supplement the argument established in this chapter. The chapter further talks about concept of *avtaras* and provides the earliest found references of Ram in regional scriptures of various states including Uttar Pradesh, West Bengal, Assam, Madhya Pradesh, Tamil Nadu, Karnataka, Maharashtra, Gujrat, Rajasthan, Haryana and Andhra Pradesh.

Third chapter focuses on the variations in text, when it comes to Ramayana. The chapter etches out the differences in the story of Rama in Ranganatha Ramayana, Bhaskara Ramayana, Kamba Ramayana and Torave Ramayana from Valmiki Ramayana. The differences have been mentioned *Khanda* by *Khanda*. In my opinion, this forms one of the most interesting parts of the book.

Chapter four brings our attention back to the narrative panels of the Ramayana. The chapter is split into two sections. One explains the panels found in the Chintalavankataramana temple while the other one focuses on Penukoda only. Again the explanation of panels is *Khanda* wise. Images have been provided so readers can relate to what's written. The chapter concludes that the Penukonda panels are more lively, charming and graceful, but also monotonous in certain features.

Fifth and the final chapter discusses the stray episodes of Ramayana found sculptured at various locations across India. The chapter proceeds in the order of these stray episodes appearing in the Valmiki Ramayana and not by the location into consideration. Quite an impressive numbers of temples have been taken into consideration for this purpose lending to the credibility of this work. Again the chapter moves *Khanda* wise and brings out the differences, in any, in the panels at various temples.

The text of the book has been supported by 95 coloured panels apart from bibliography and glossary. The book is very informative, well written and should be read by anyone who is interested in learning about the evolution of the Ramayana epic. The text however can get a little overwhelming at places for a person who does not have a background in history. But the interesting explanation of panels keeps the readers motivated enough to read through the last page.

Asha Joshi

Sharma, R. K. (Ed.) 2007 *History, Archaeology and Culture of Narmada Valley*, Sharada Publishng House, Delhi, pp. 316, Plates 85. Price Rs. 2500.00

The voluminous book is a compilation of forty five bilingual (English and Hindi) research articles presented in the national seminar on History and Archaeology of Narmada Valley. As we know the Narmada, one of the important river of India has uniquely preserved the past material evidence regarding environment and human cultures through the ages. So, the book begins with the prehistory of Narmada basin and its tributary. It include archaic human evidence, upper palaeolithic culture, bone tool Industry, rock art research as well as new excavation around this valley.

In Epigraphy section a number of inscriptions mostly from Kalachuri dynasty are reported. Along with this a good number of articles on numismatics found there due space in this volume. Iconographic issues are also very well documented in different articles here.

Down the chronology this edition also covered articles on early, medieval and modern historical as well as contemporary philosophy, literature, religion and art of Narmada valley.

This book like an encyclopedia on the Narmada river valley has very well documented different issues on Archaeology, History and Culture of the region.

This excellent attempt of bringing together different research papers in a volume is certainly deserves due appreciation. The illustration in black white also supported the texts.

Mukta Raut Dey

Kanungo Alok K.(Ed.) 2006 *Excavating Waves and Winds of (Ex) Change: A study of Maritime Trade in Early Bengal* by Shahnaj Husne Jahan, South Asian Archaeology Series, published from Oxford, pp. 250, 53 photographs and maps and 25 tables, Price about $82.80/ £46.00

In the present book the author has done a thorough and serious research from her first hand knowledge being an archaeologist from Bangladesh which forms the major geographical region of early 'Bengal' under study. She has also properly utilized the literary sources both from the foreign travellers and Indian and Bangladeshi archaeologists and historians of past and modern times. The source studies are indeed exhaustive. The author has presented her study mostly obtaining these source materials in seven different chapters. The First chapter thus locates ports that operated in the region of 'Bengal' from earliest times to the first half of the 16th Century A.D. In Second chapter she discusses the commodities that were exported and imported through these ports. She also deals here the complex port - hinterland relationship that arose because of these commodities. Chapter Three examines various media of exchange that have been in circulation in 'Bengal'. The next chapter inquires into the types of vessels that were engaged in the maritime trade of 'Bengal'; describes their process of construction; attempts to identify the indigenous tradition of maritime vessels and probes into the level of proficiency that Bengali shipwrights attained. Chapter Five examines various aspects of nautical science that evolved through this period and examines how maritime vessels were navigated during coastal voyages and in the high seas and in what way the climate affected the sailing schedule. It also attempts to show the pattern of change in the navigational technology and its consequences in maritime voyages. Chapter Six identifies the trade routes which connected the ports of 'Bengal' with the Red Sea coast and the Persian Gulf in the west and Southeast Asia in the east. Instead of assimilating mere facts, the chapter also attempts to discern the pattern of change in the trade routes and comprehend why they changed. The last chapter examines who the merchants were and what was their operative milieu.

Besides, in the Introduction of the monograph the author has very carefully defined the 'Trade' and 'Maritime Trade' in the context of her present study. She has also provided here a brief but very effective chronological history and geographical accounts of the region presently Bangladesh and West Bengal. The source materials of her study have also graphically been presented to understand and clarify her research backdrop.

The book, I hope, shall be a useful source material for further study on the subject in future. One however, wonders that having such reach maritime activities along the cost of Bengal for a long time through her various ports; the archaeological evidences are rather poor. In view of the present study and the modern technological developments it would be possible to further explore and excavate the sites of interest even underwater exploration to find fresh evidences for writing a new chapter of maritime history of Bengal. Could it be an Indo – Bangladesh Venture?

S.S. Biswas

Basu Durga 2005. ***N. B. P. Cultures of Eastern India,*** R. N. Bhattacharayya Publishers and Booksellers (Exporters), pp.138 Kolkata. Price Rs. 4500.00

The work comprises of two volumes, *i.e.* I and II dealing respectively with texts and plates and figures. The text *i.e.* vol. I have 138 pages. Text portion is preceded by forward, preface, abbreviation and introduction. Bibliography and index are appended at the end. Volume II has 297 plates and 91 figures, at the fag end of the volume II is a map of India demarkating the area occupied by N. B. P. sites.

The main body, that is, the text is divided into five chapters. The chapter no. I deal with the geographical areas designated as an area of attraction and isolation on pattern, as designated by Subbarao. The main geographical divisions are Gangas-Yamuna Divide, Middle Ganga valley plains, Lower Ganga valley plain including the coastal area of Orissa.

The chapter no. II describes the N. B. P. yielding sites according to the areas described above. Besides, the settlement patterns of various regions of attraction and isolation are described. The author has suggested a time bracket between 1000-550 B.C., whereas the acceptable bracket ranges between c. 700-300 B.C.

The chapter no. III discusses the socio-economic archaeological history of the entire Gangetic valley. Emergence of occupational groups namely potters' guilds, weavers, blacksmiths, carpenters, sculptors, gold smiths etc. Significantly there was marked surplus food production leading to emergence of currency level to overall prosperity and growth of political authority which lead to emergence of Janapadas, Mahajanapadas and struggle for establishment of an Empire. In this struggle ultimately Magadha won the war.

In the chapter IV the author discusses the transition from Vedic religion to religion of complicated rituals, rites, and sacrifices.

Chapter V deals with growth of religious and secular architecture like Stupa, Chaitya, and Viharas. At the end are given an exhaustive bibliography.

The work is based upon detailed research into archaeological excavations and contemporary literature to form a very important aspect of technology and trade system, prevailing in this region of India. It is useful for students and scholars to understand the latest distribution and other cultural details of NBP associated cultures.

R.P. Sharma

REPORT OF THE XL ANNUAL CONFERENCE

Report of XL Annual Conference of Indian Archaeological Society held at the Jiwaji University, Gwalior, Madhya Pradesh, from 2nd to 5th December 2006.

The joint Annual Conference of the three Societies *viz.* Indian Archaeological Society, Indian History and Culture Society and Indian Society for Prehistoric and Quaternary Studies was inaugurated by Prof. G. N. Gautam, Pro-Vice Chancellor, Jiwaji University on 2nd December, 2007.Prof. S. Rajguru of Deccan College released the Puratattva No. 36, a journal of the Indian Archaeological Society and also gave the Presidential address.

The theme of the seminar ***Issues And Problems of Central Indian Chalcolithic Cultures of India*** was introduced by K. N. Dikshit who spoke about Kayatha culture, which in course of time was succeeded by Ahar and Malwa cultures. The same sequence was followed at most of the excavated sites viz. Atud Khas, Dangwada Azad Nagar and Rumija. A number of archaeologists from different parts of the country like B.R.Mani, V.H. Sonawane, J.N. Pande, Sunil Gupta, D. V. Sharma, R. K Chattopadhyay and others expressed their views on this issue keeping in mind respective regional areas vis-à-vis the beginning of Chalcolithic Cultures. As the calibrated dates of Ahar culture goes back to the beginning of 3rd millennium B.C., as such the date of Kayatha culture should also be pushed back. B.R. Mani claimed that on the basis of cultural sequence recent excavations will also push back the antiquity of commonly hold date of NBPW to three-four centuries earlier. An agreed opinion emerged that a new look is necessary to assign a time-bracket to these cultures.

The academic sessions were held from the second day of the conference till the valedictory Session on the 5th December, 2006. Some of the papers were read in the joint sessions.

Programme

3rd December 2006, Sunday,
Morning Session

B.B.Lal
BMAC Culture

Michael Danino
Sacred Geography and Harappan Town Planning

Presidential address
S.Rajguru
Action Archaeology

A.R. Gupta
Remote Sensing

Chairperson: S. D. Sharma

R. K. Chattopadhyay, R. Sanyal & K. Bandopadhyay
Use of Stone and Bone in the Food Procurement Processing Strategies of Early Farming Villages of Central and Eastern India.

D.V. Sharma
Excavation at Sanauli.

Afternoon Session

Sunil Gupta
Elements of Continuity: The 'Dark Age' and the Indian Food Trade with the Indian Ocean.

Alok Tripathi
Excavation at Mahabalipuram.

4th December 2006, Monday
Morning Session

Chairperson: V.H. Sonawane

O.P Misra
Jain Bronze Images from Bhopavar.

Mukta Raut Dey
Hunting Scenes in the Rock Art of Jharkhand.

Orza Rounaghy and Vasant Shinde
Cultural and Artistic Inter Action between Central India and Central and North East Iran.

Devendra Nath Ojha
Jharkhand ki Abhilekhon me Pratibimbit Dharmik Jivan.

Namrata Chatterjee
Huna Invasion.

Vimal Tiwari
Saryupar-Some aspects of Chalcolithic Culture.

Neeta Yadav and Uma Parashar
Archaeology Of Erich with Special Reference to A Study on Erich Coins.

Abdul Reza
Report of Archaeological Survey on Palaeolithic Sites at Marudasht, Fors Province, Iran.

Shalini Mishra
Pakhna Bihar se prapt kuchh Mrinmudrankan

Smitha S. Kumar
Naga Iconography in Kerala.

S.V. Rajesh
Reflection of Harappan Urbanism in Gujarat.

A.S. Gaur and Sundaresh
Recent Marine Archaeological Discoveries along the Saurashtra Coast.

Afternoon Session

Chairperson: V.D. Mishra

M.D. Kajale
Initial Results of the study of Ancient Plant Economy from Excavation at Agiabir, District Mirzapur,Uttar Pradesh.

V.H. Sonawane
Nagri Inscription from Pavagadh, Champaner.

J.N. Pal and M.C. Gupta
Neolithic Ceramic Industry at Jhusi.

D.P. Dubey and Ashish Kr. Dubey
Copper Plate Grant of Ramapala, [Vikrama] Samvat 1215.

S. Vasanti
A Unique Terracotta Bull (Bos Indicus) from Anadipatti Excavation.

Dipak Kumar Roy
Navin Ebam Tamra Pashan Kalin Mritbhanda Parampara.

Manuel Joseph
Ganeha's portrayal and Artists Liberty.

5th December 2006
Morning Session

Chairperson: S. Nagraju

Dhanpat Singh Dhania
Indus Script Deciphered.

L.S. Rao
The Harappan Spoked Wheels Down the Streets of Bhirrana, District Fatehabad, Haryana.

Mohd. Shafi Zahid
Bronze Art in Kashmir.

Vinay Kumar Gupta
New Aspects of Later Period Mathura Terracottas.

J.N. Pande
Rock Cut Sculptures at Dasarathghat, District Chitrakoot, Uttar Pradesh: An Iconographic Perspective.

K. Hemishukla
Mahipal ke Abhilekhon me Varnit Abhushan Prakar.

D. Bhengra
The Arrival, Early Settlements and Movement of the Mundas in Chhotanagpur Division on the Basis of Megalithic Remains.

P.K. Singh and U.C. Singh
Application of Remote Sensing in Archaeology.

Afternoon Session

The valedictory session was delivered by Prof. O. P. Agrawal, Vice Chancellor, Jiwaji University. The delegates thanked the Department of Ancient Indian History, Culture and Archaeology, Jiwaji University and especially Prof. R.A. Sharma, Prof. A.K. Singh and other staff members for the success of the conference.

K. N. Dikshit
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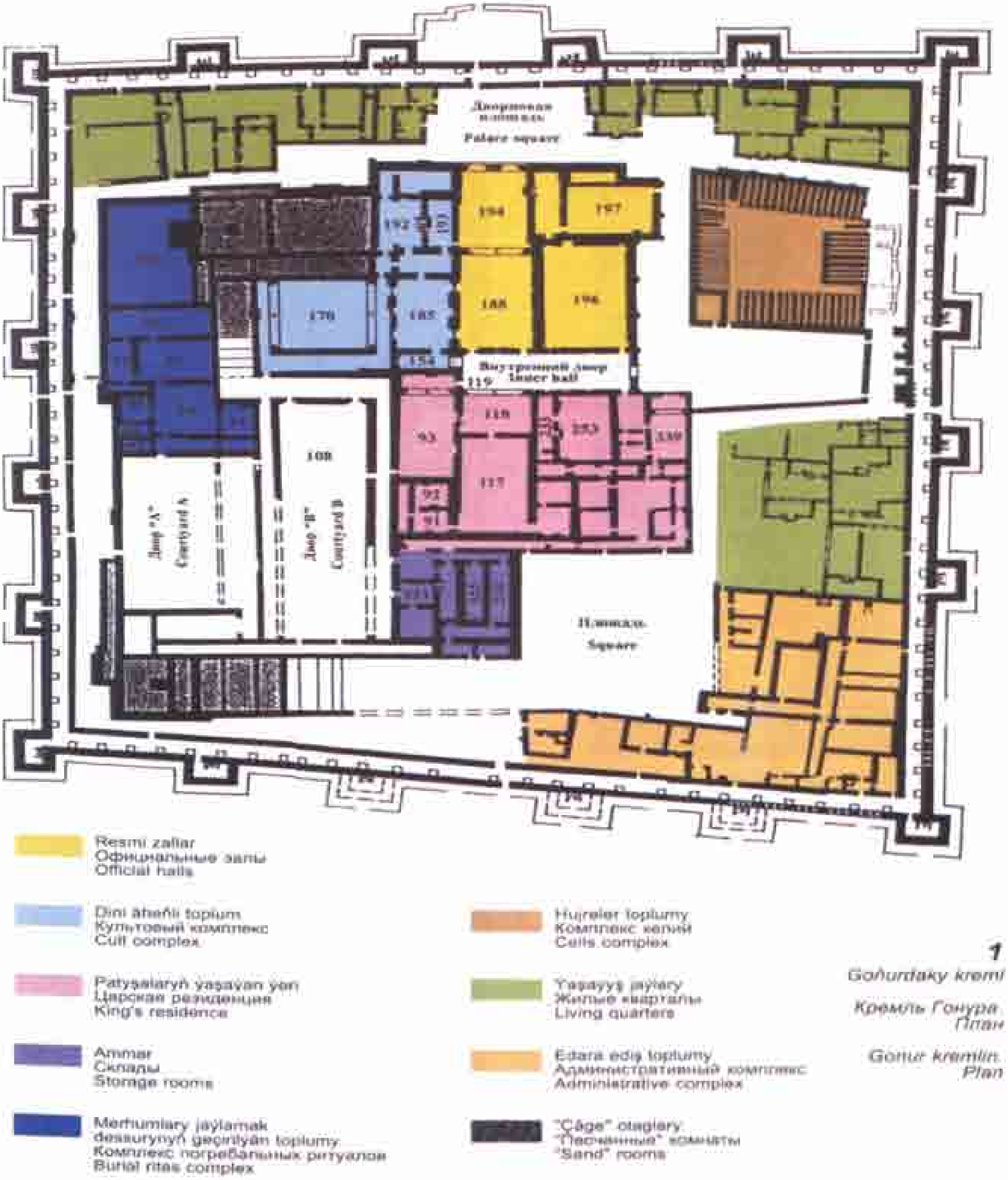
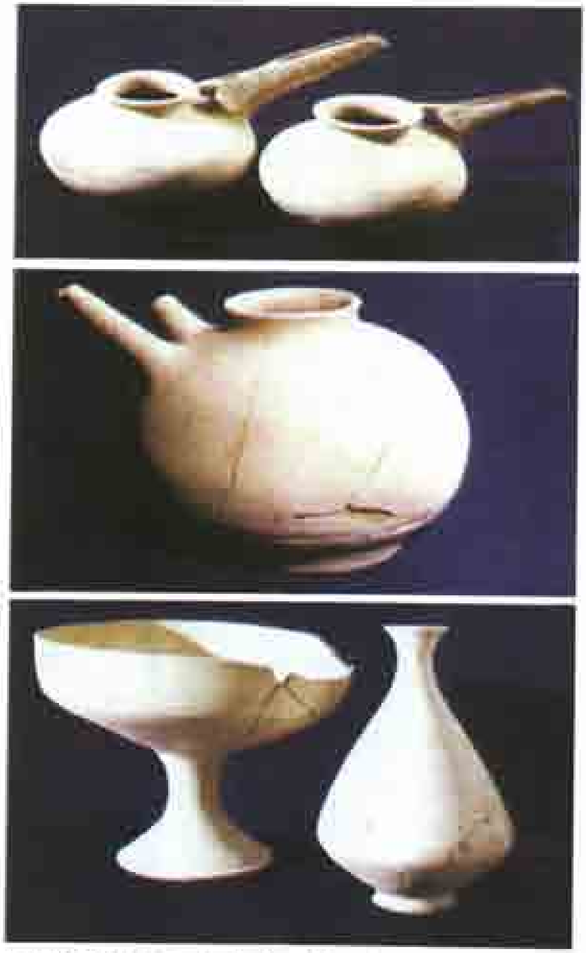
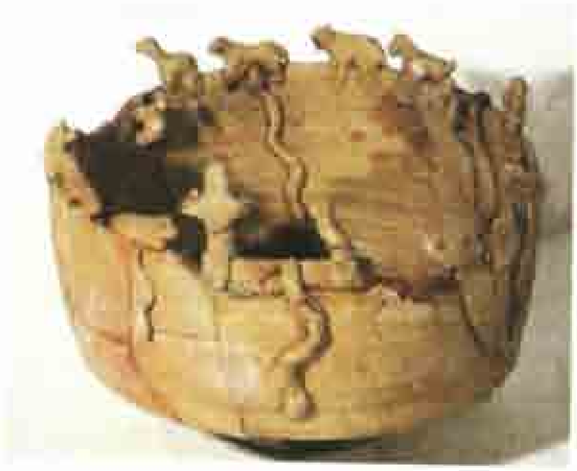
K.N. Dikshit 26948971 (R)



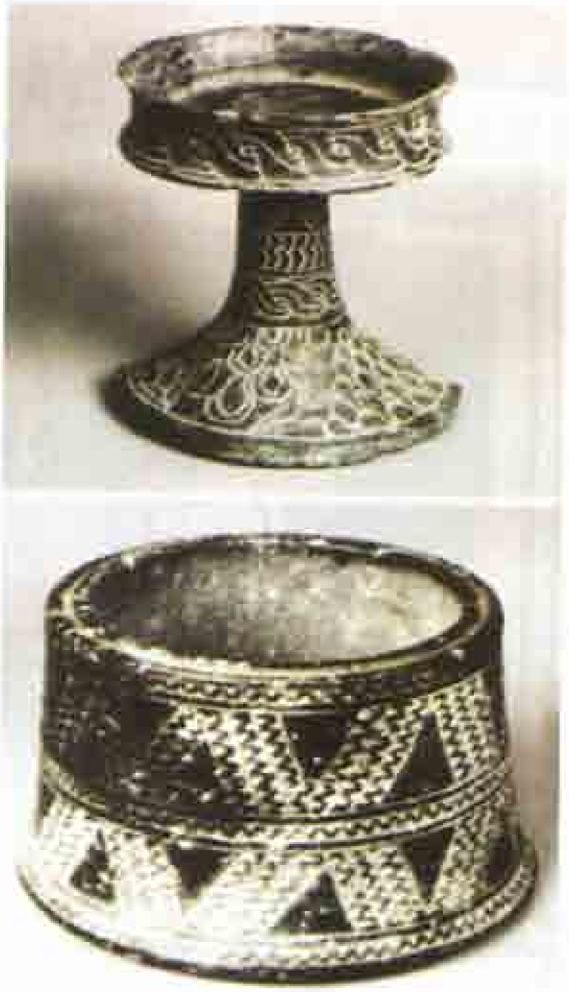
Lal, Pl. 1. : "Citadel" at Gonur, Margiana



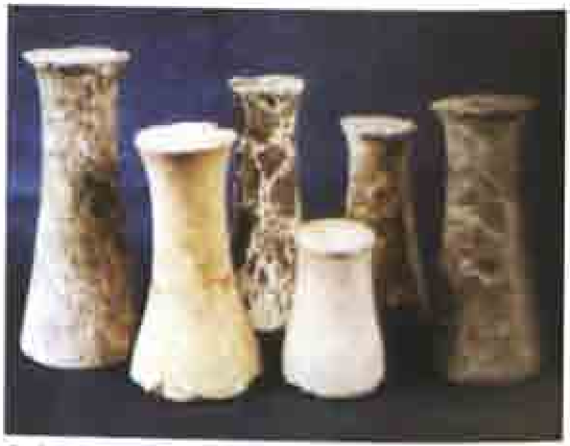
Lal, Pl. 2: Pottery vessels from Margiana



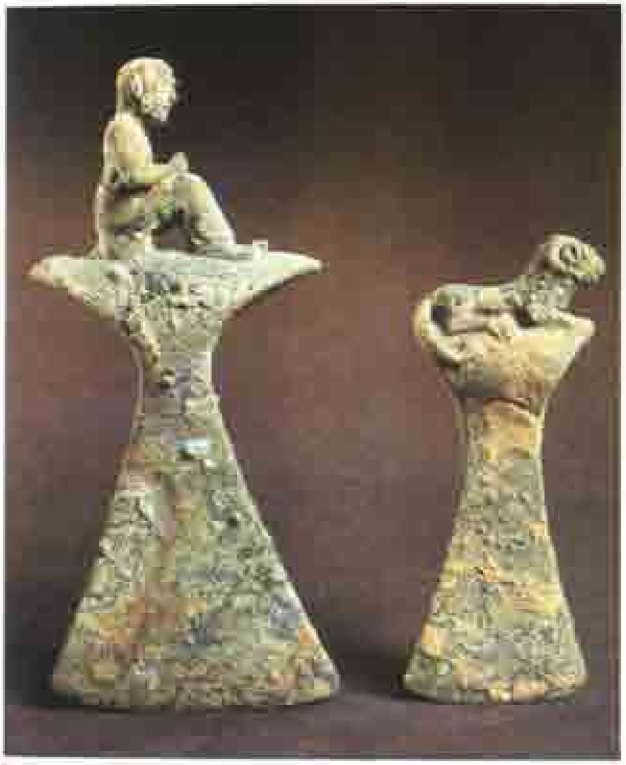
Lal, Pl. 3: Cult vessel from Togolok- 1 temple



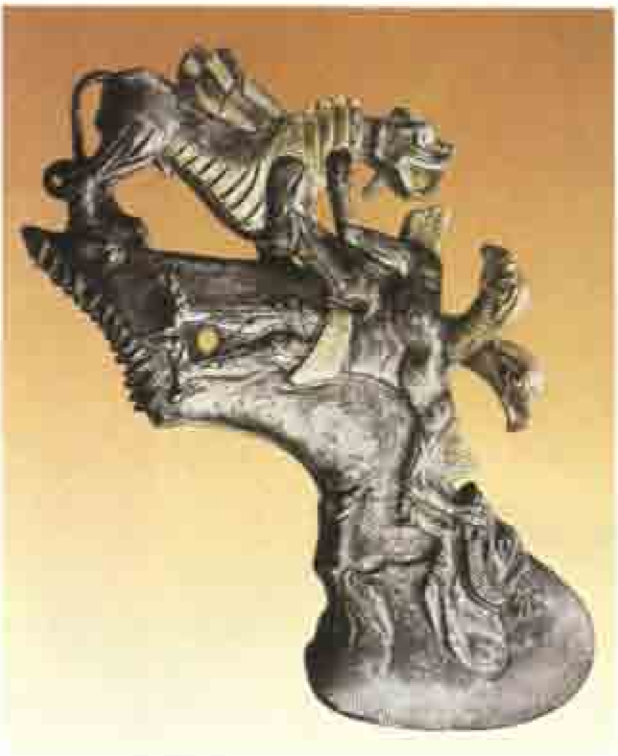
Lal, Pl. 4 : Craved stone vessels from Gonur, Margia



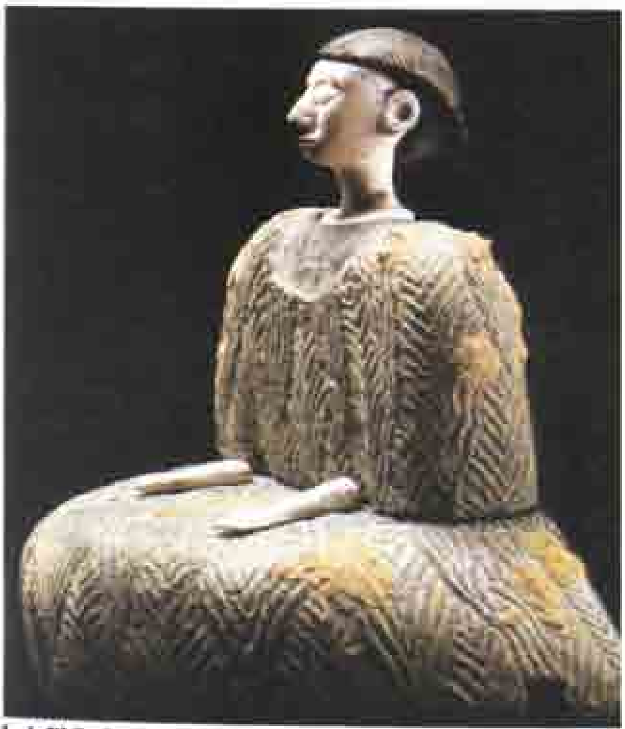
Lal, Pl. 5.: Stone 'dainty columns' from the temple, Togolok-21



Lal, Pl.6: Bronze axes from Bactria

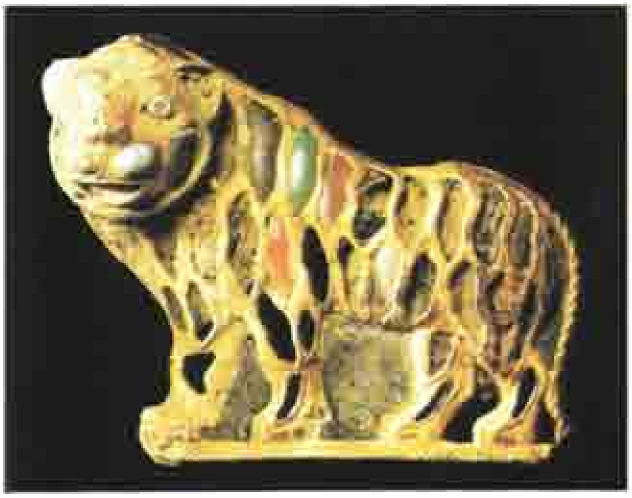


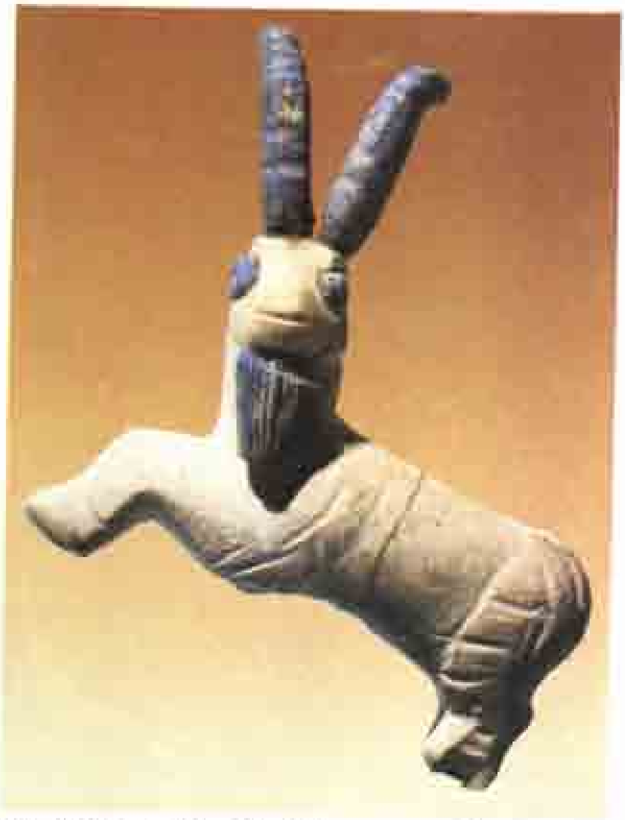
Lal, Pl.7: Silver ceremonial axe with parts covered in gold lamina from Bactria



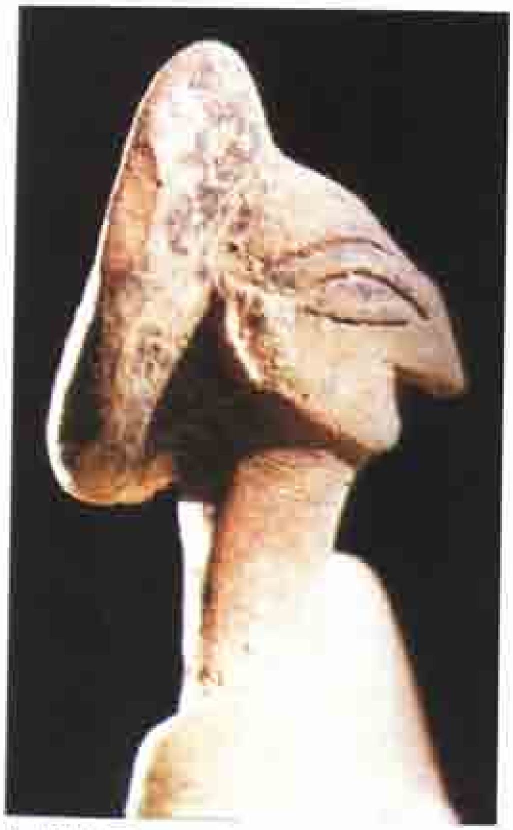
Lal, Pl.8: Composite stone figurine from Bactria

Lal, Pl.9: Chlorite and gold leaf representation of a feline, with semi-precious stone inlay

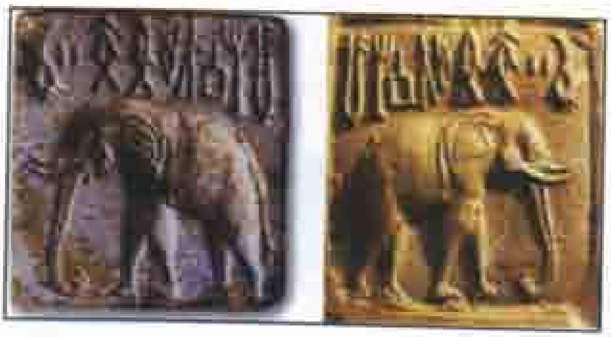




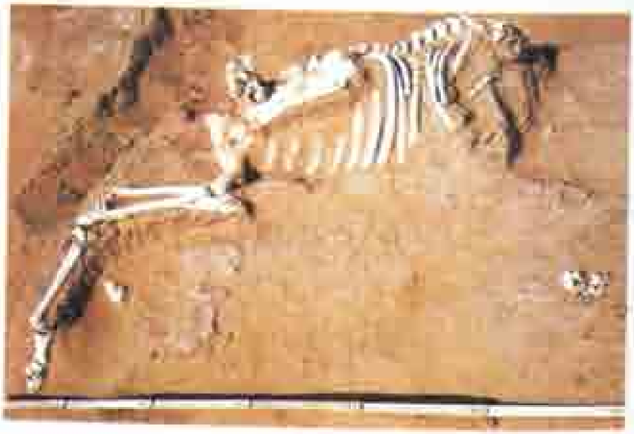
Lal, Pl.10: Limestone goat with horns, eyes and beard in lapis lazuli



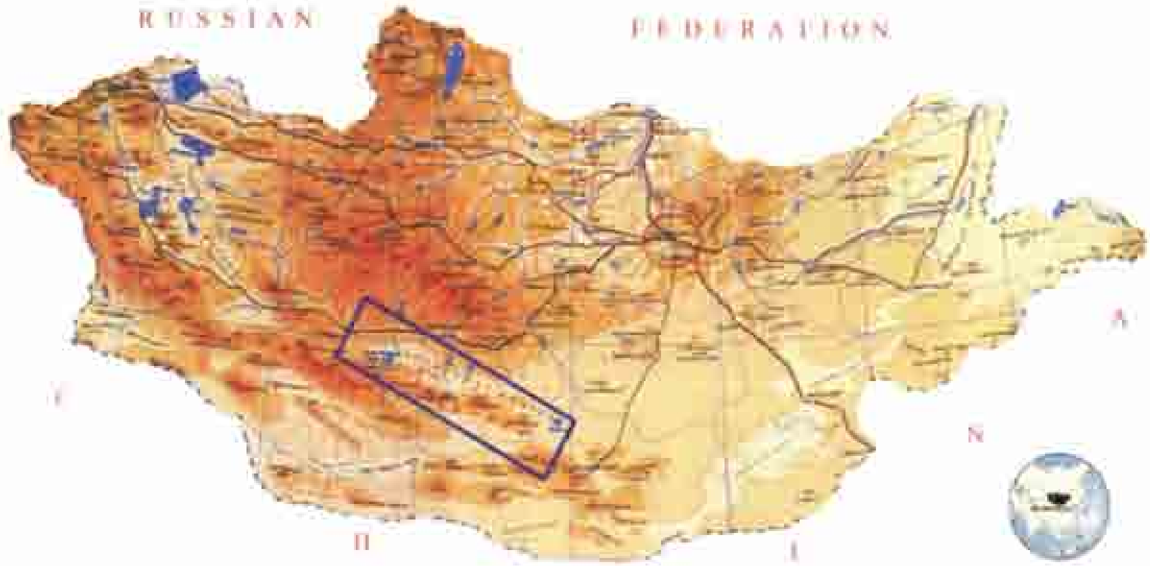
Lal Pl.11. Terracotta figurine from Gonur-depe necropolis



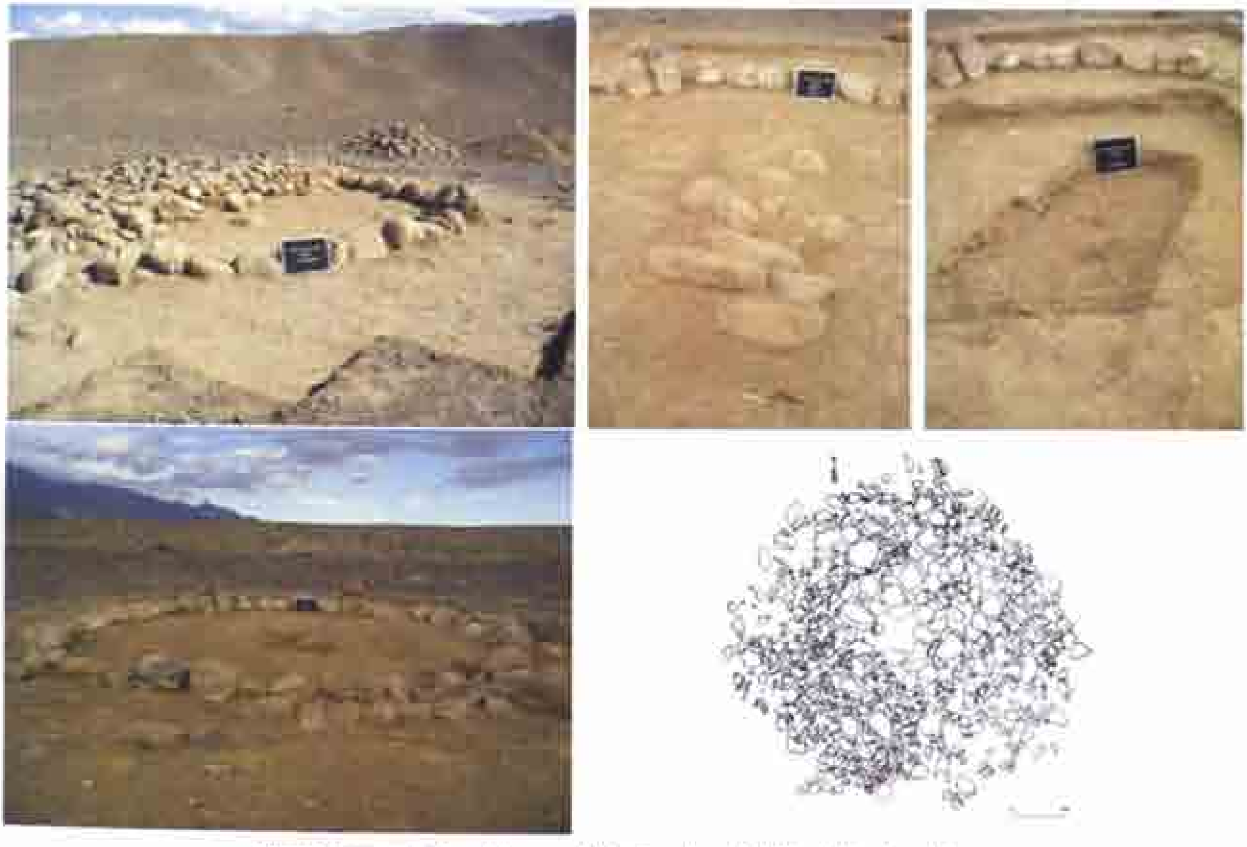
Lal, Pl.12: Harappan seal from Gonur, and its impression



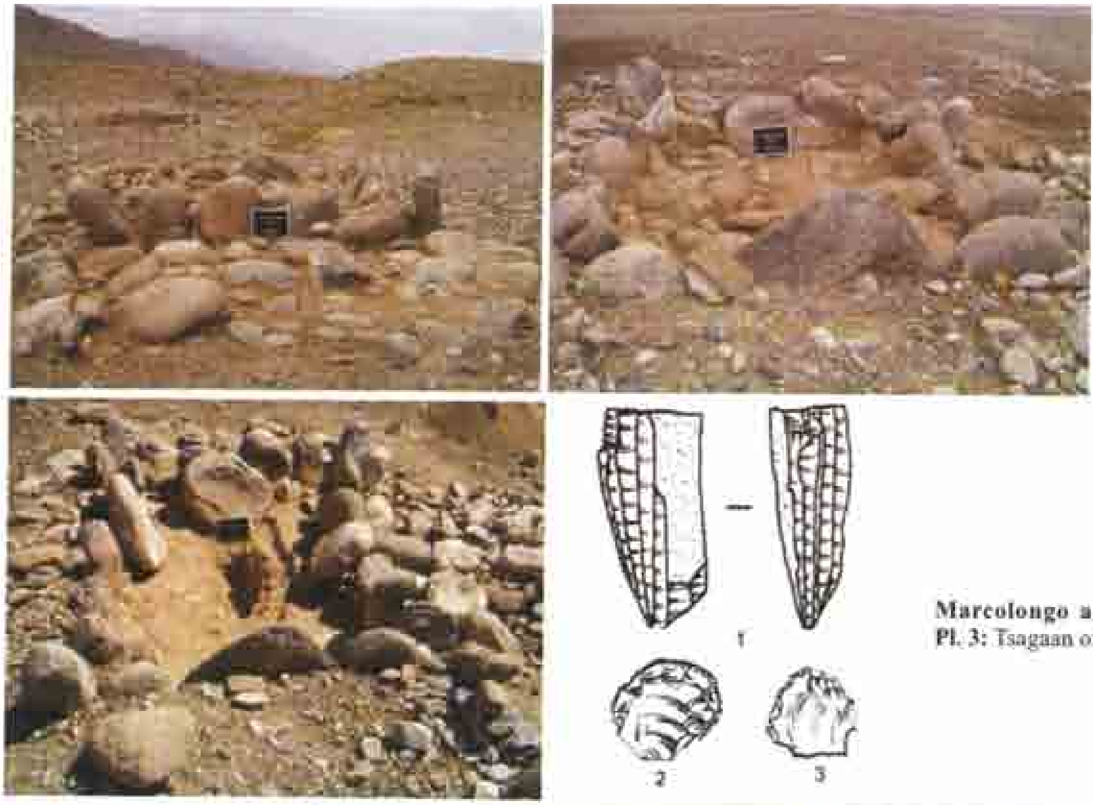
Lal, Pl.13: Burial (?) of a horse in Gonur-depe



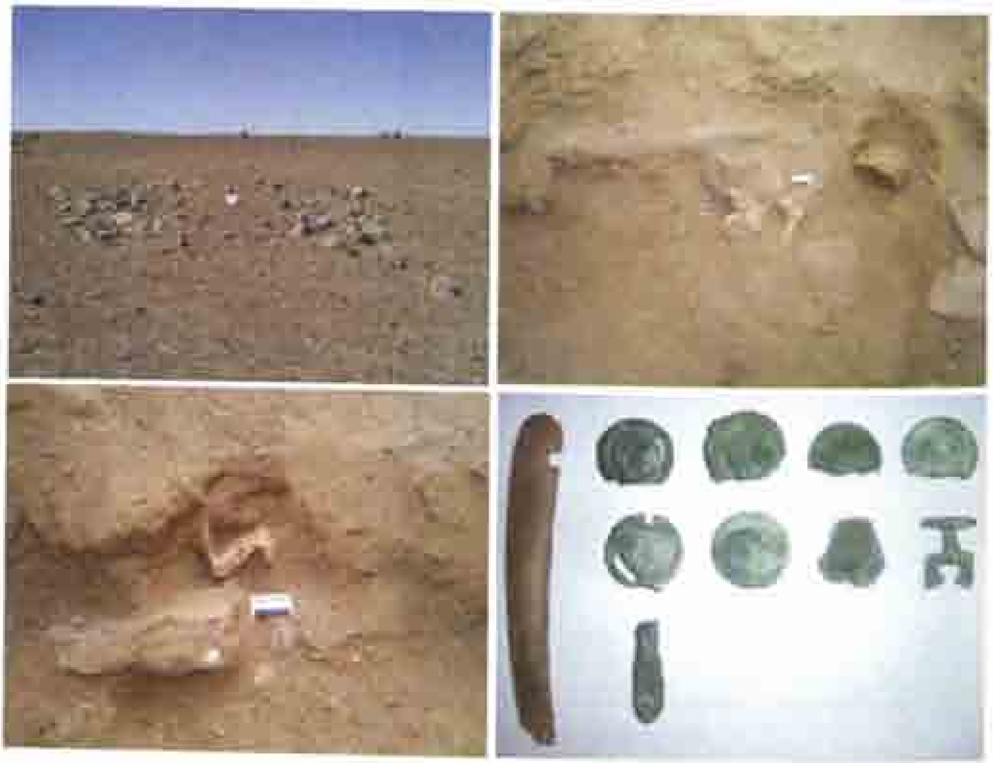
Marcolongo and Gunchisuren, Pl.1: Joint CNR-MAS Geoarchaeological project concession area



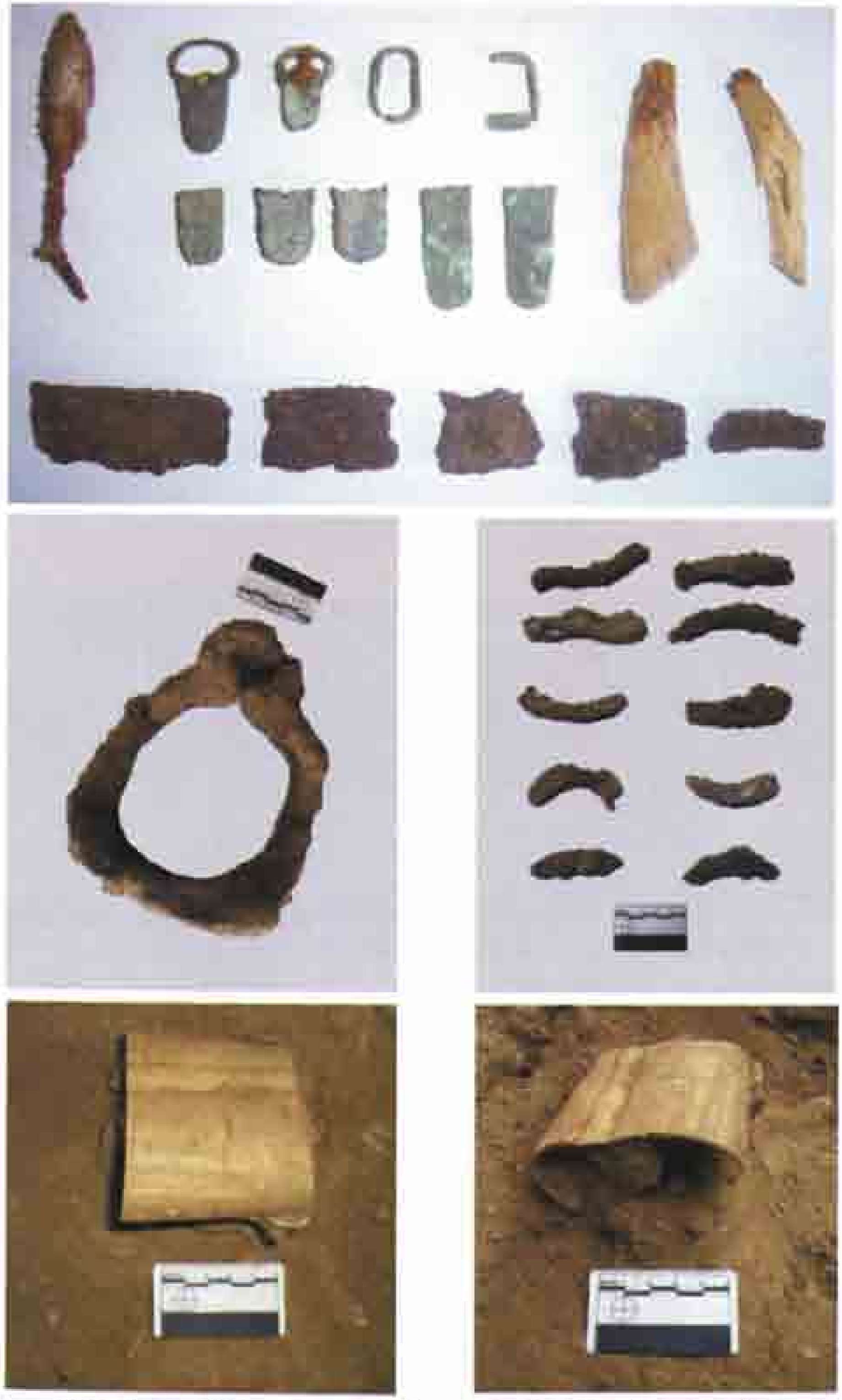
Marcolongo and Gunchisuren, Pl.2: Zeregleen Bel Tomb No. 1 and 2



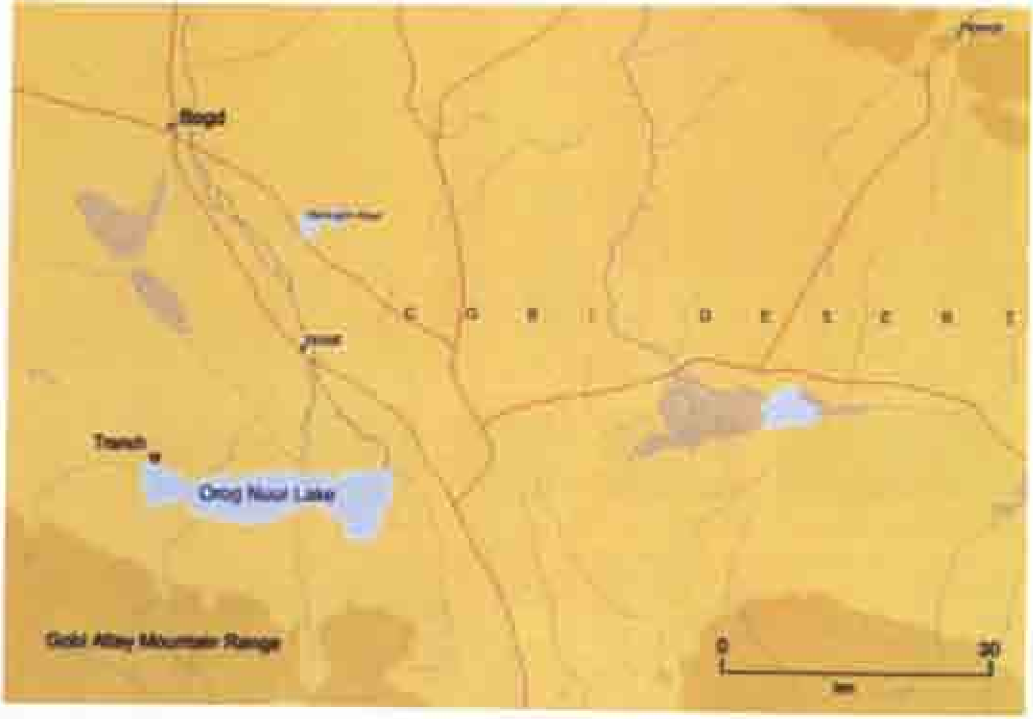
Marcolongo and Gunchisuren, Pl. 3: Tsagaan ovdog Tomb No. 1



Marcolongo and Gunchisuren, Pl. 4: Artifacts from Tarimalt Tomb No. 1

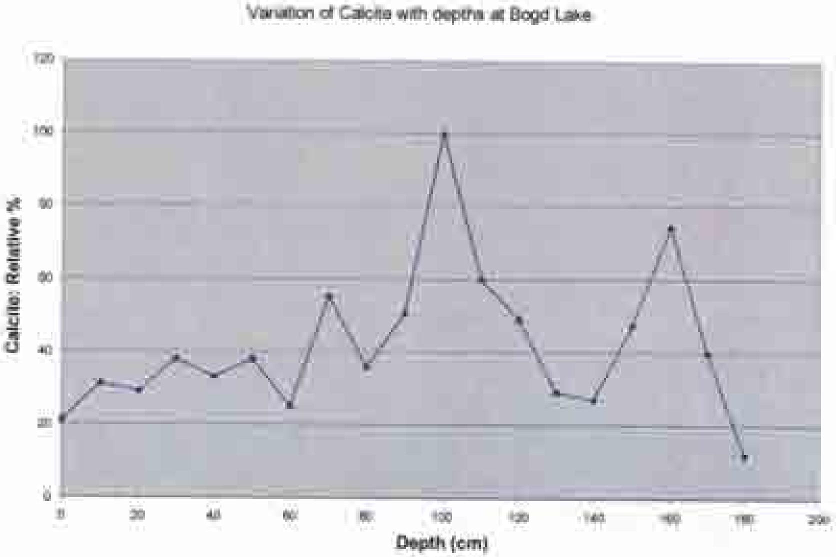


Marcolongo and Gunchisuren, Pl.5: Photos of artifacts from Tarimalt Tomb No.02

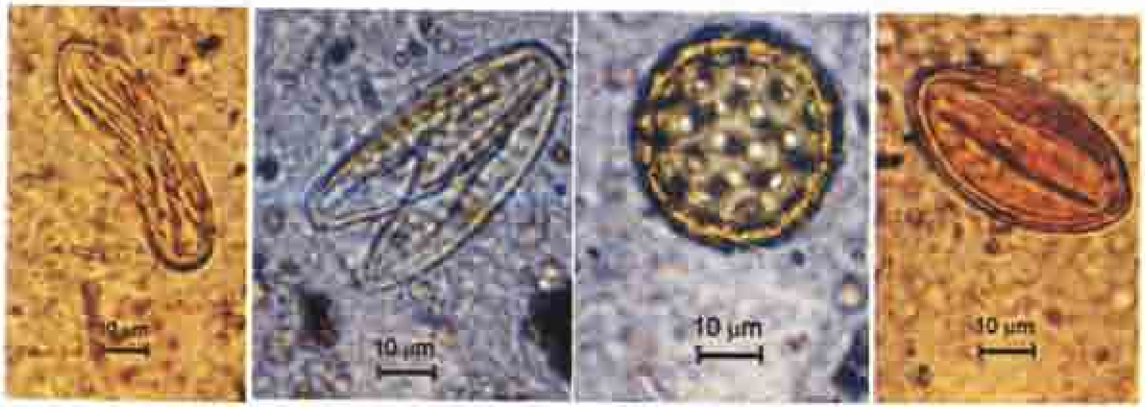


Gogte *et al.*, **Pl.1:** Location of the trench taken for collecting sediments at Orog Nuur Lake

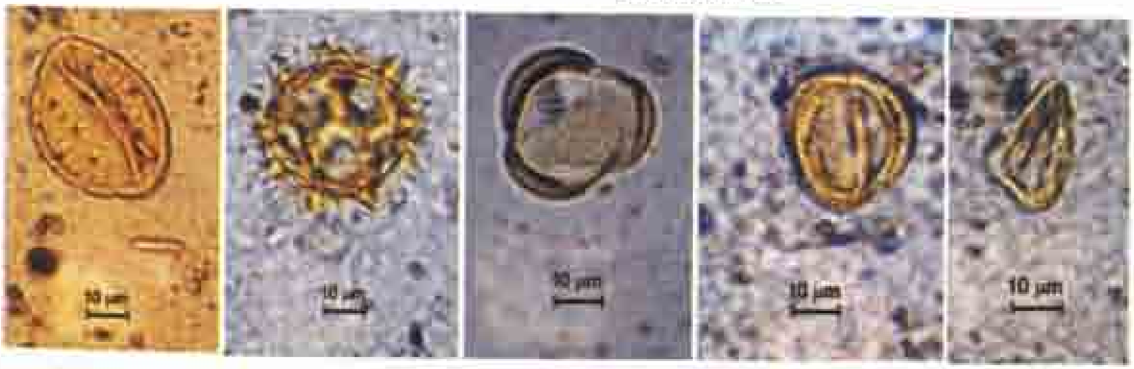
Gogte *et al.*, **Pl.2 :** Location of trench is about 500 m inside the north-western periphery of the Orog Nuur Lake



Gogte *et al.*, **Pl.3** :Variation of calcite with depth in the sediments of the Orog Nuur Lake

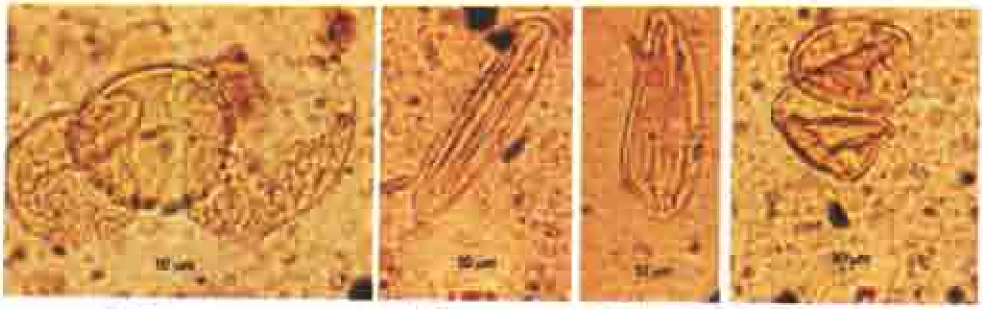


a) Acanthaceae
b) Acanthaceae 1
c) Amaranthaceae/ Chenopodiaceae
d) Anacardiaceae

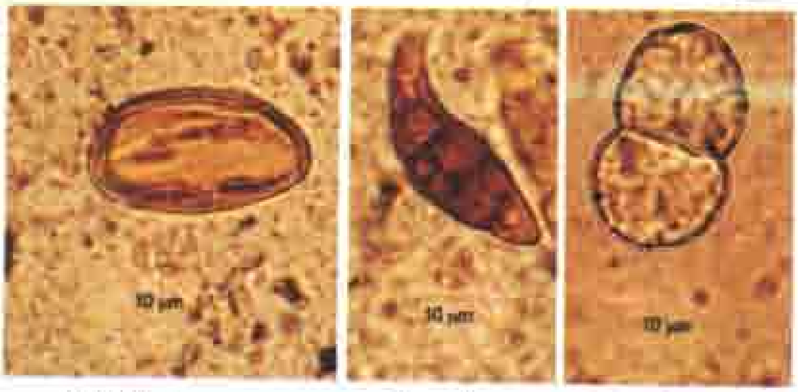


e) Arecaceae
f) Asteraceae
g) Brassicaceae
h) Brassicaceae 1
i) Cyperaceae

Gogte *et al.*, **Plate 4:** Pollens recovered from the trench at Orog Nuur Lake

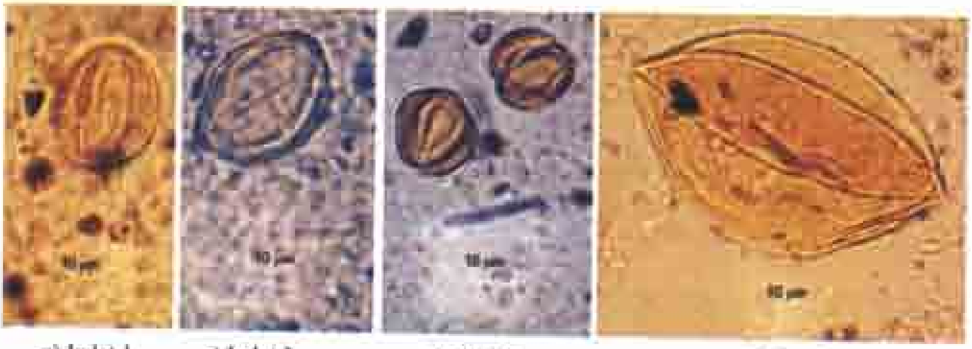


j) Pinaceae k) Gnetaceae l) Liliaceae m) Magnoliaceae

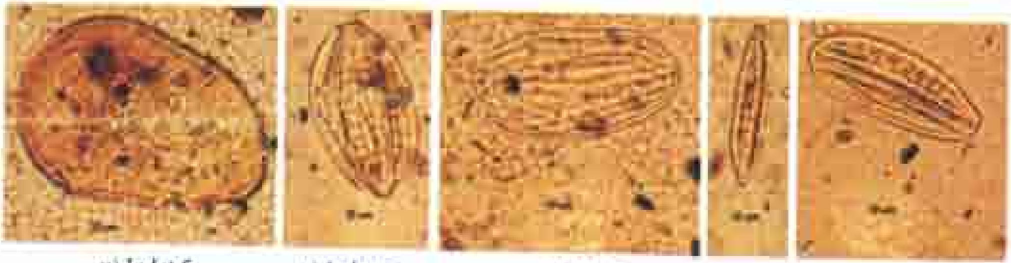


n) Meliaceae o) Fungal spore p) Fungal spore 1

Gogte *et al.*, **Plate 5:** Pollens recovered from the trench at Orog Nuur Lake

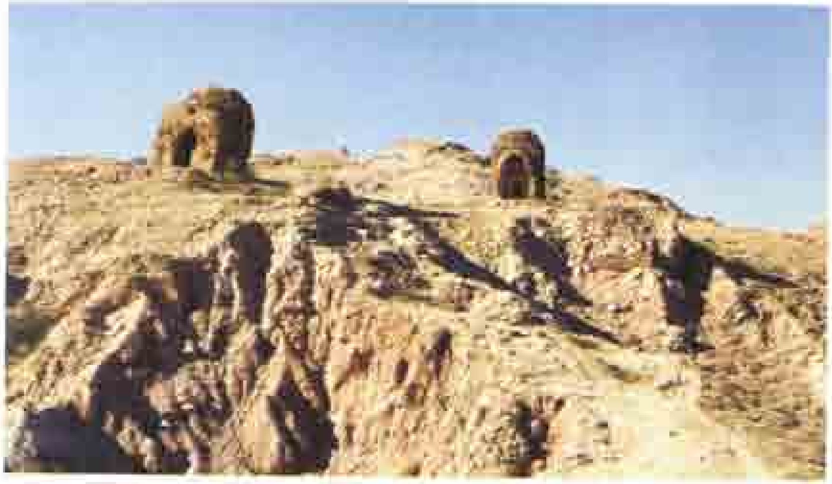


q) Indet 1 r) Indet 2 s) Indet 3 t) Indet 4



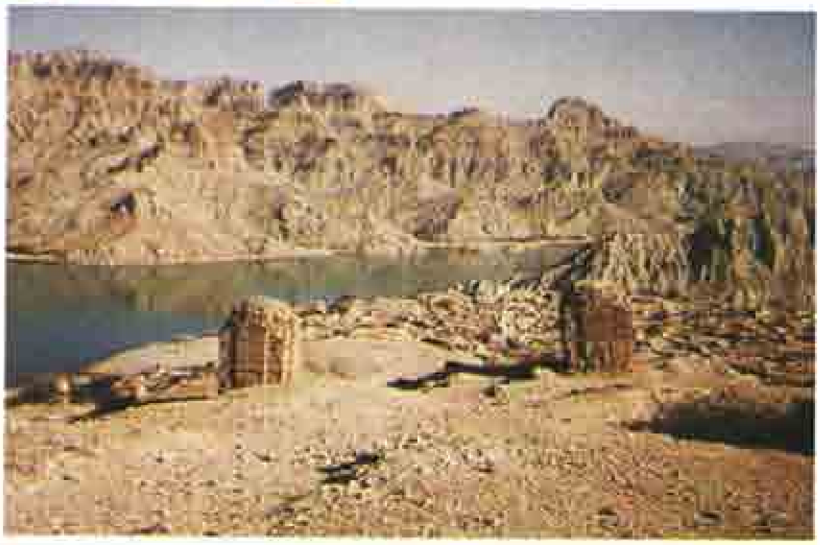
u) Indet 5 v) Indet 6 w) Indet 7 x) Indet 8 y) Indet 9

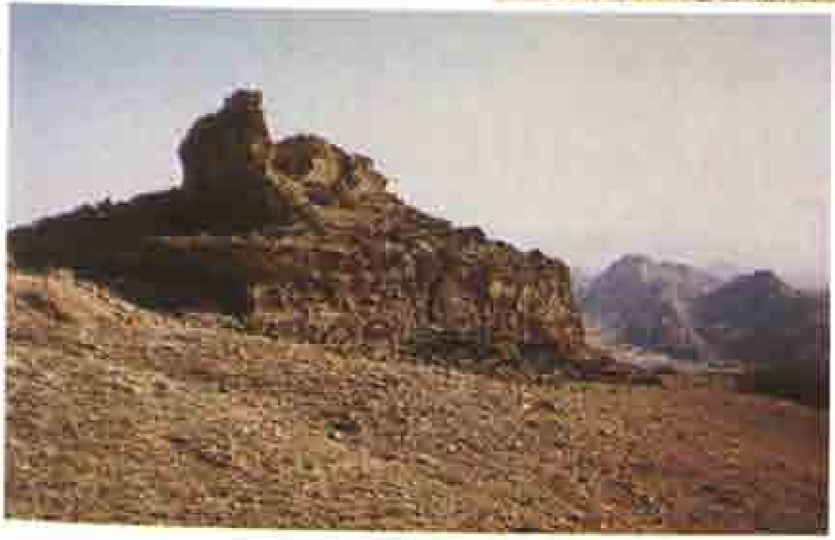
Gogte *et al.*, **Plate 6:** Unidentified microfossils from the Orog Nuur Lake sediments



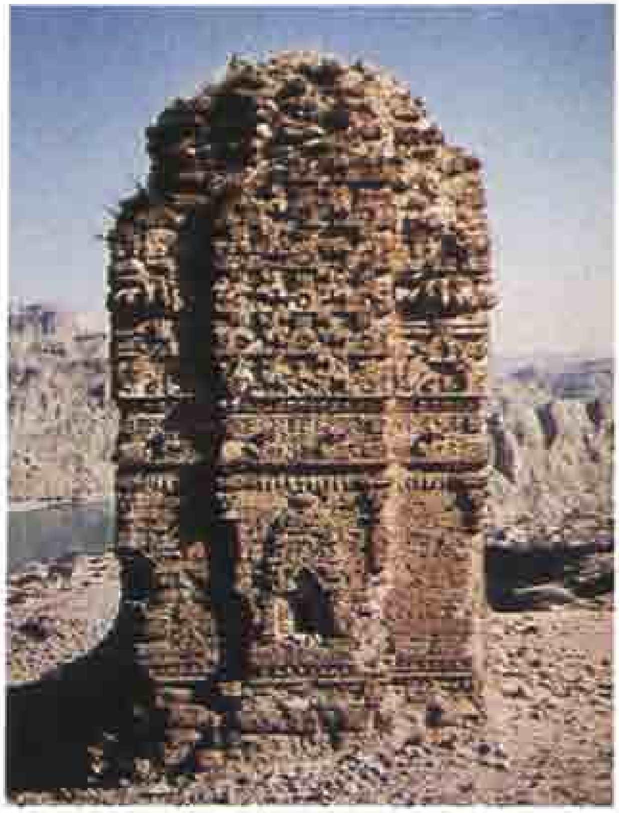
Masih, Mari Indus, Pl.1: Eastern group of temples. View from east

Masih, Mari Indus, Pl.2: Eastern group of temples and river Indus. View from west.



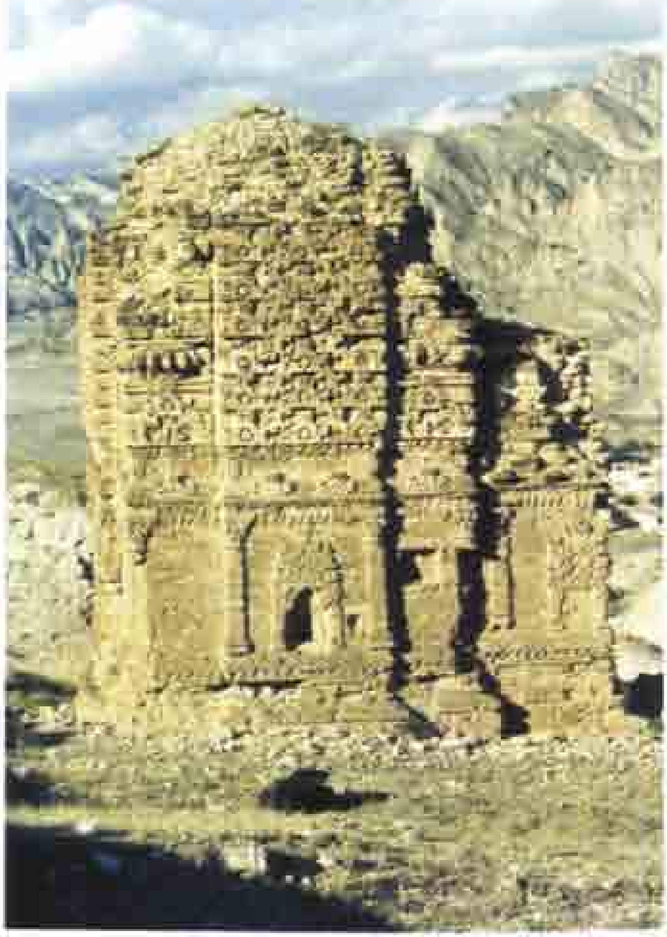


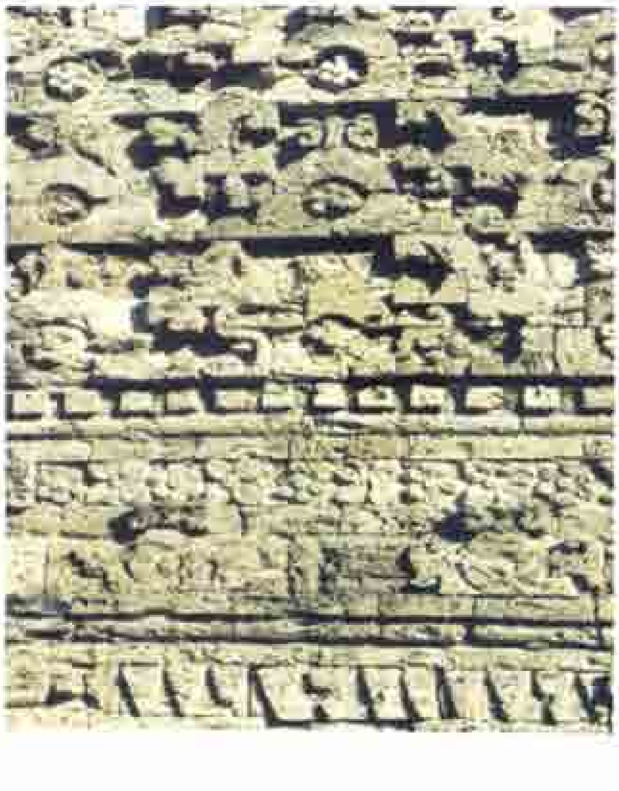
Masih, Mari Indus, Pl.3: Temple C



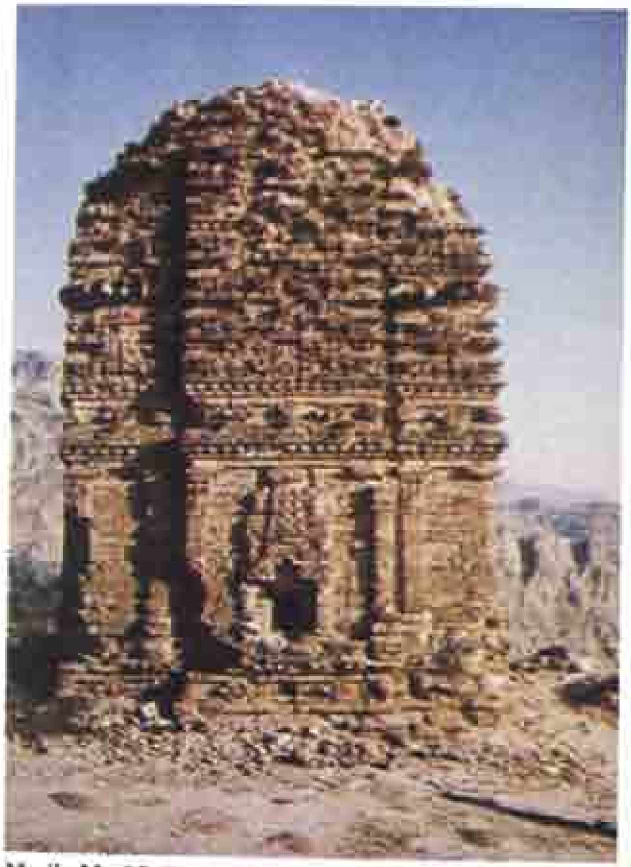
Masih, Mari Indus, Pl.4: Temple A. From South

Masih, Mari Indus, Pl.5: Temple A. From South

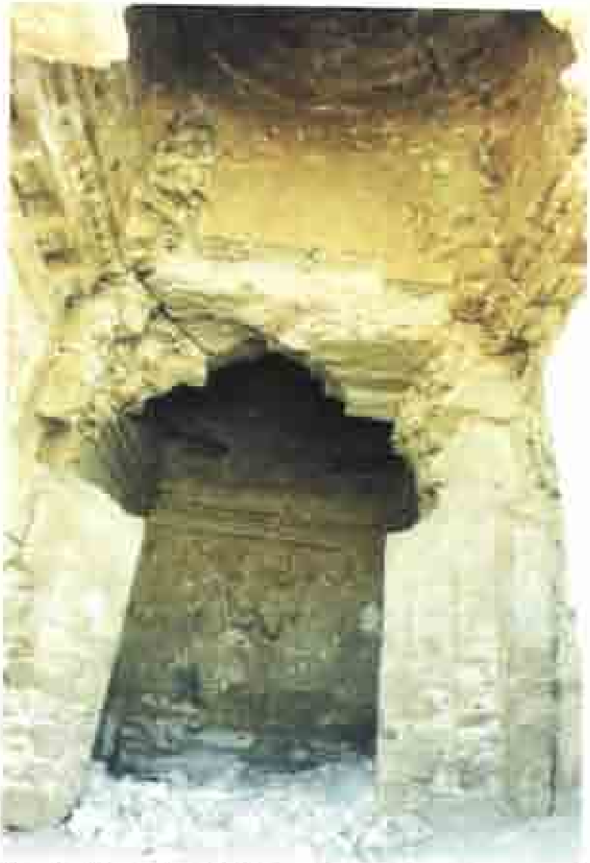




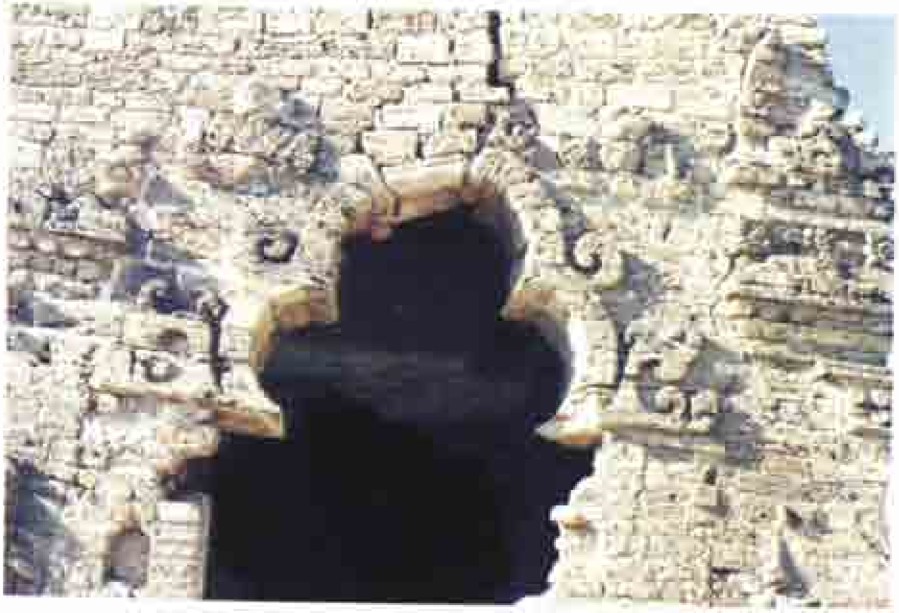
Masih, Mari Indus, Pl.6: Temple A. Decoration on *varandika* and *sikhara*



Masih, Mari Indus, Pl.7: Temple B. View from west



Masih, Mari Indus, Pl.9: Temple B. A defaced figure seated on lotus in upper corner of *antarala*

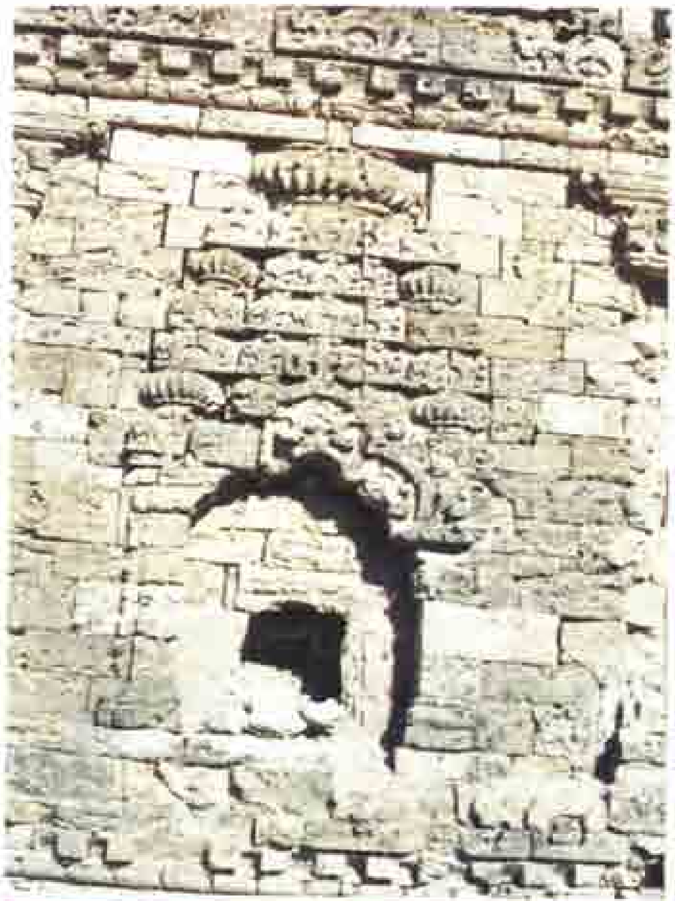


Masih, Mari Indus, Pl.8: Temple B. Trefoiled entry to *anatrala*

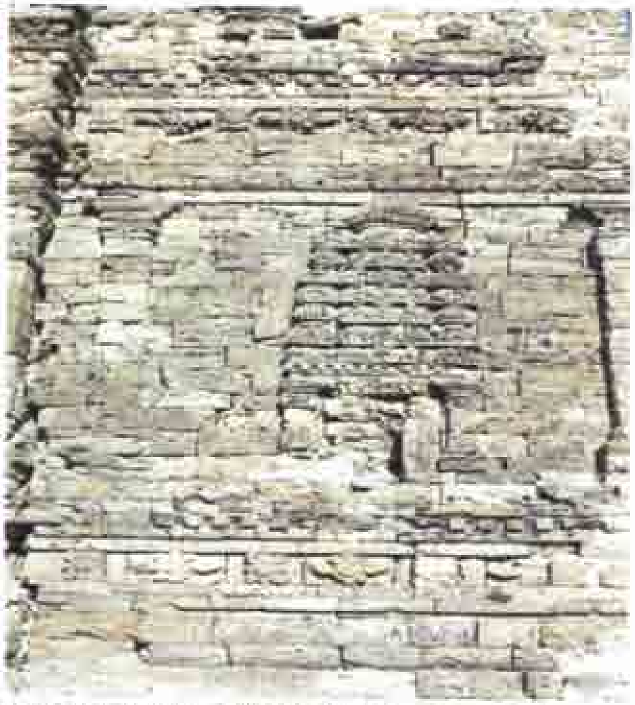
Masih, Mari Indus, Pl.10: Temple B. Domical roof adorned with lotus and a seated figure supporting the roof of *antarala*

Masih, Mari Indus, Pl.11: Temple B. *Garbhagriha*, wooden bar above the sloping pendentive

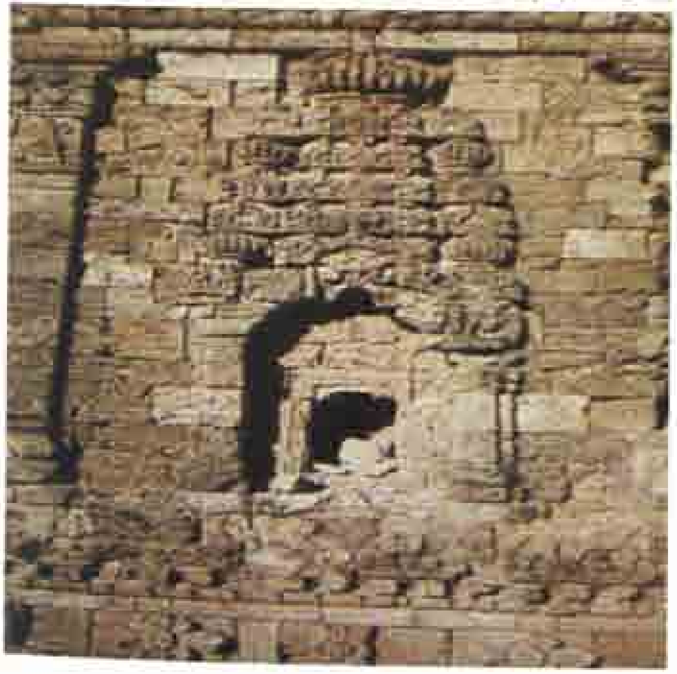
Masih, Mari Indus, Pl.12: Temple B. A lotus in the centre of shallow dome of *garbhagriha*



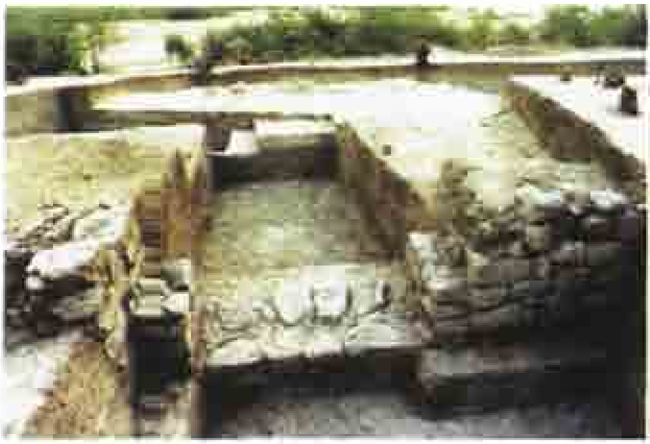
Masih, Mari Indus, Pl.13: Temple B. From South



Masih, Mari Indus, Pl.15: Temple B. A *praggrive* nich



Masih, Mari Indus, Pl.14: Temple B. Close view of *Bhadra* nich and shrine model



Rajesh and Patel, Gujarat, Pl. 1: Eastern Gateway of Bagasra/ Gola Dhoro (Courtesy: Department of Archaeology and Ancient History, M.S. University of Baroda)

Rajesh and Patel, Gujarat, Pl. 2 : Datrana: General view (Courtesy: Department of Archaeology and Ancient History, M.S. University of Baroda)

Rajesh and Patel, Gujarat, Pl. 3: Loteshwar: General view (Courtesy:Department of Archaeology and Ancient History, M.S. University of Baroda)

Rajesh and Patel, Gujarat, Pl. 4: Motipipli: General view (Courtesy: Department of Archaeology and Ancient History, M.S. University of Baroda)

Rajesh and Patel, Gujarat, Pl. 5: Nagwada: General View (Courtesy: Department of Archaeology and Ancient History, M.S. University)

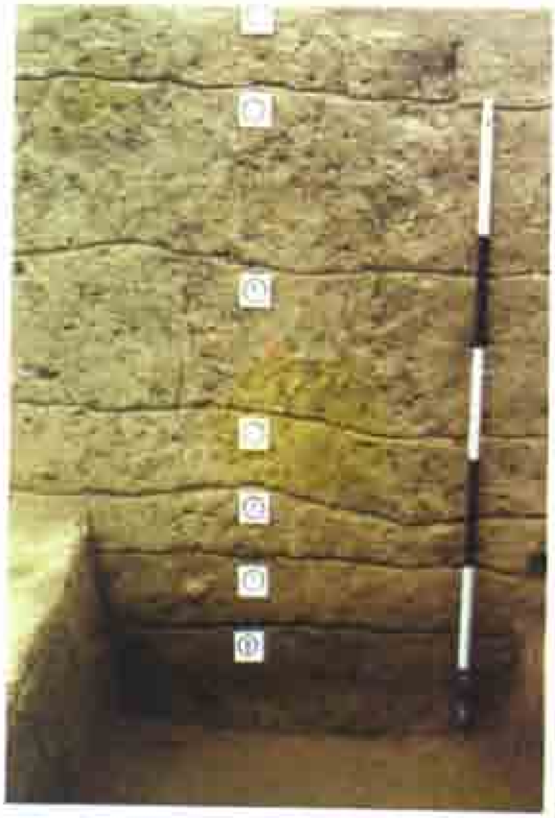
Rajesh and Patel, Gujarat, Pl. 6: Padri: General view

Rajesh and Patel, Gujarat, Pl. 7: Pithad/Jaidak: General view (Courtesy: Department of Archaeology and Ancient History, M.S. University of Baroda)

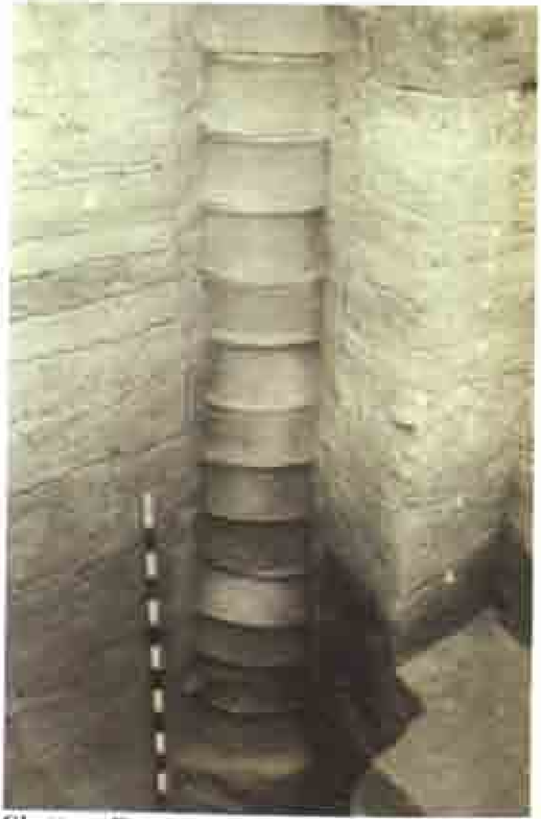
Rajesh and Patel, Gujarat, Pl. 8: Ratanpura: General view (Courtesy: Department of Archaeology and Ancient History, M.S. University of Baroda)

Rajesh and Patel, Gujarat, Pl. 9: Santhli: General view (Courtesy: Department of Archaeology and Ancient History, M.S. University of Baroda)

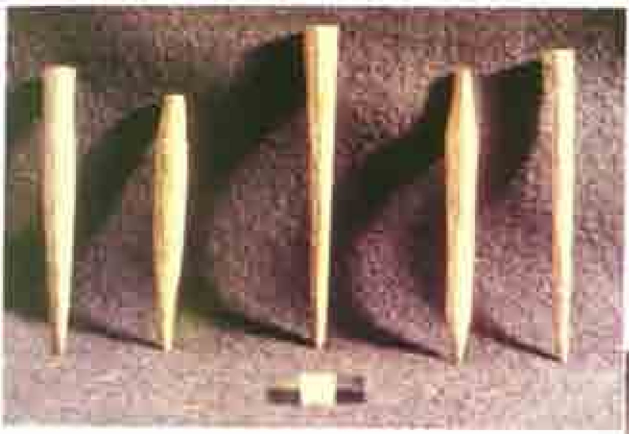
Chattopadhyay *et al.*, **Mangalkote, Pl.1:** Extensive unexcavated mound of Garedanga



Chattopadhyay *et al.*,**Pakhanna, Pl.2:** Excavated Northern Section (Trench A2) of Bhairabdanga. (Courtesy: Dept.of Archaeology,University of Calcutta)

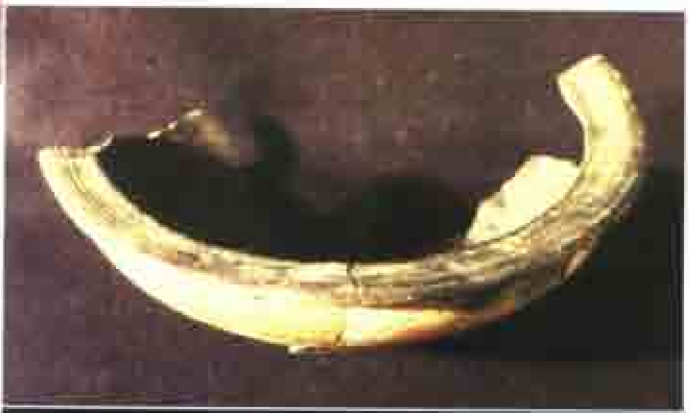


Chattopadhyay *et al.*, **Mangalkote, Pl.3:** Early Historic terracotta soak-pit with working level penetrating through the EVF stratum, on the western section (Trench B8) of Sarkaridanga mound.(Courtesy: Dept.of Archaeology, University of Calcutta.)

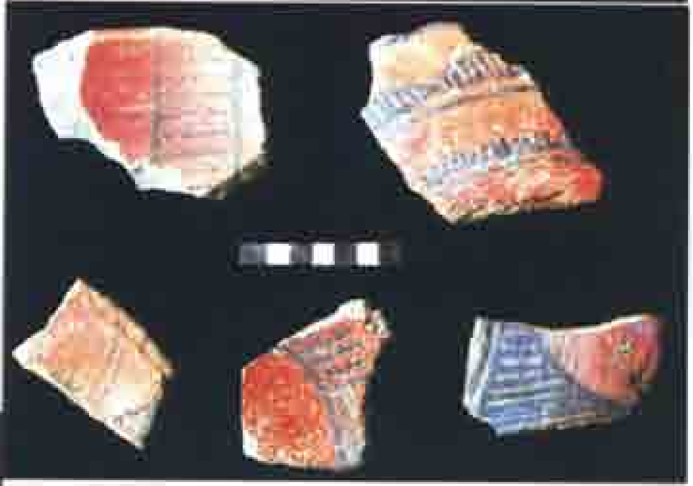


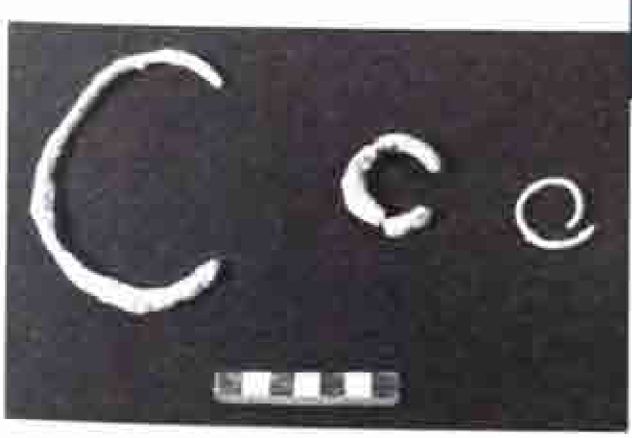
Chattopadhyay *et al.*, **Pakhanna, Pl.4:** Excavated bone points, Bhairabdanga mound. (Courtesy: Dept.of Archaeology,University of Calcutta.)

Chattopadhyay *et al.*, **Pakhanna, Pl.5:** Excavated Black-and-Red Ware from Bhairabdanga mound. (Courtesy: Dept.of Archaeology,University of Calcutta.)

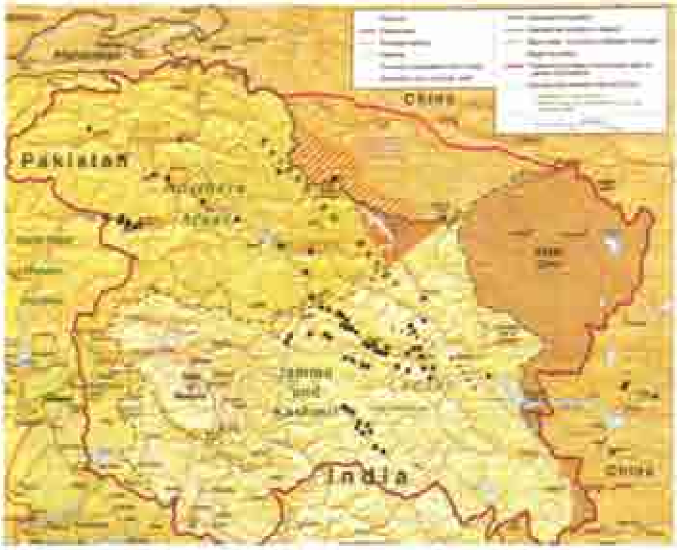


Chattopadhyay *et al.*, **Pakhanna, Pl. 6:** Black-and-Red Ware, associated black-painted Red Ware from Bhairabdanga mound (Trench A3). (Courtesy: Dept. of Archaeology, University of Calcutta.)

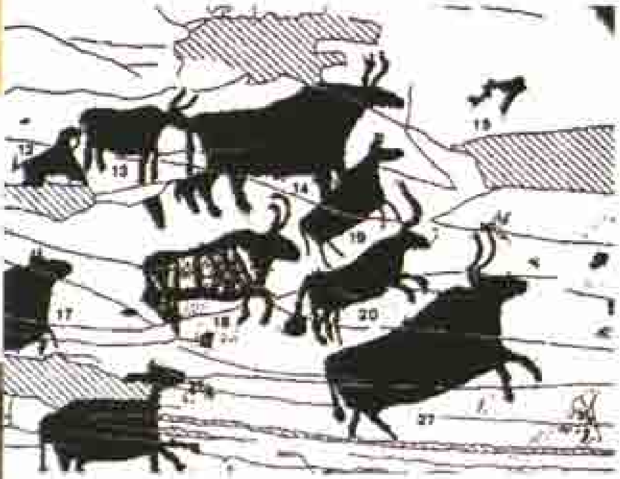




Chattopadhyay *et al.*, **Pakhanna, Pl. 7:** Excavated copper bangle and ear rings from the mound of Bhairabdanga (Trench A2). (Courtesy: Dept. of Archaeology, University of Calcutta.)

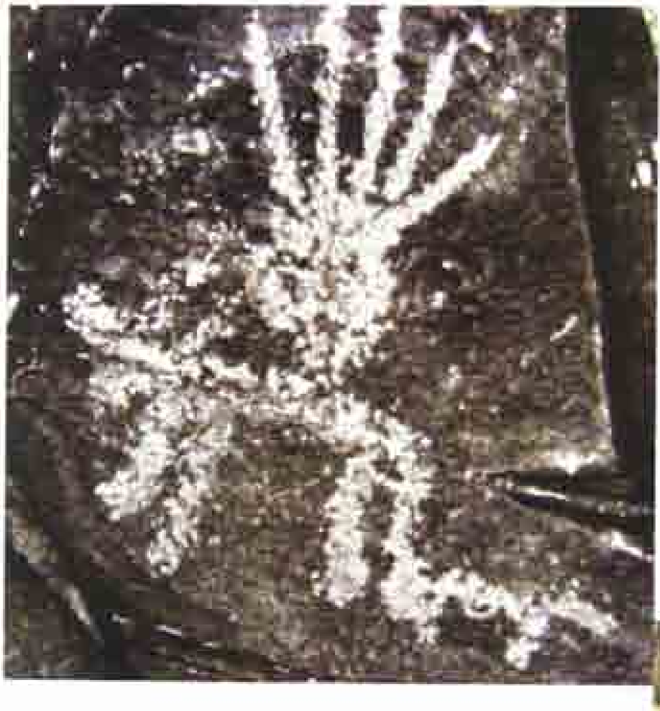


Bruneau, Pl.1: Map of rock art locations in the Western Himalayas, from west to east: the Upper Indus Valley (Pakistan), Ladakh (India) and Rutog district (western Tibet/China). (Map produced by the US Central Intelligence Agency: Kashmir region 2003)

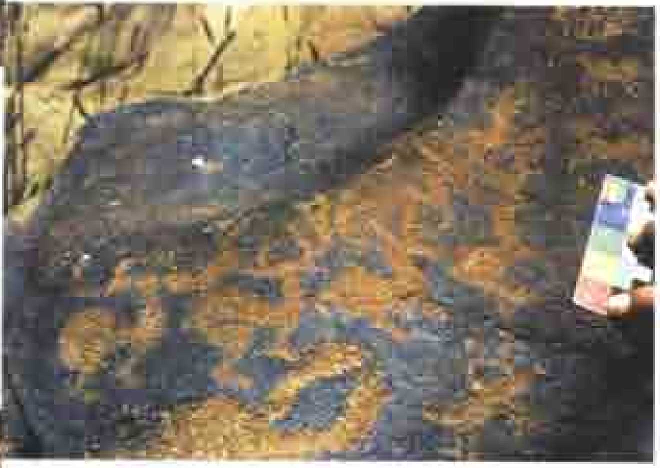


Bruneau, Pl.2: Engraved aurochs at Ust'-Tuba II, Minusinsk, South Siberia. Bronze Age. (after www.epistemes.net/petro/index.php)

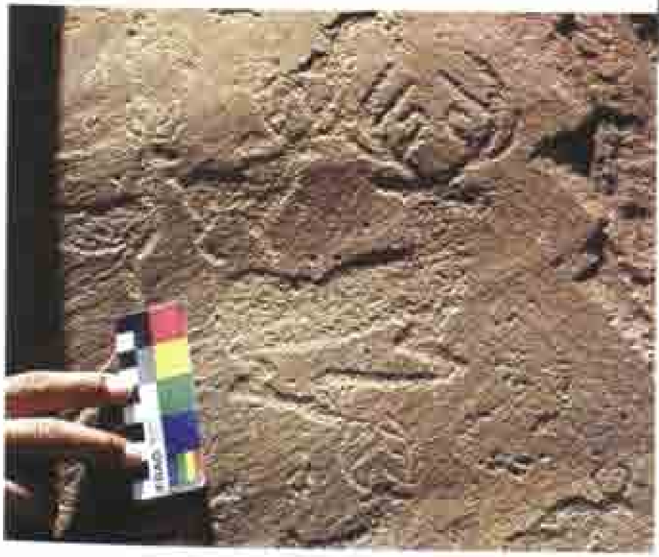
Bruneau, Pl.3: engraved yaks at Nabulong, Rutog district, Western Tibet. Bronze Age. (after Li Yongxian and Huo Wei, 1994: catalogue no 56)



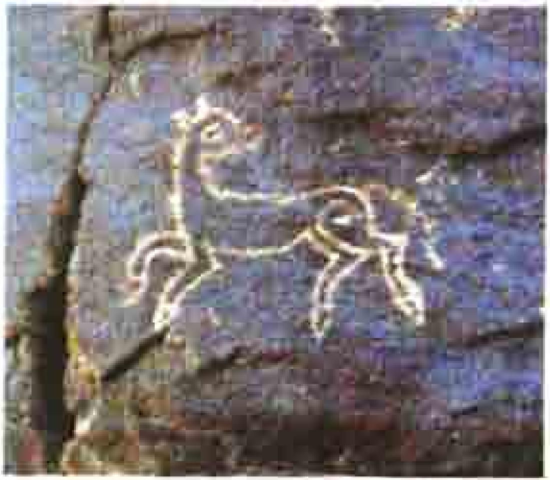
Bruneau, Pl.11: 'feathered' or 'radiating' mask, Tungri, Zanskar (Ladakh). Photograph by I Riaboff



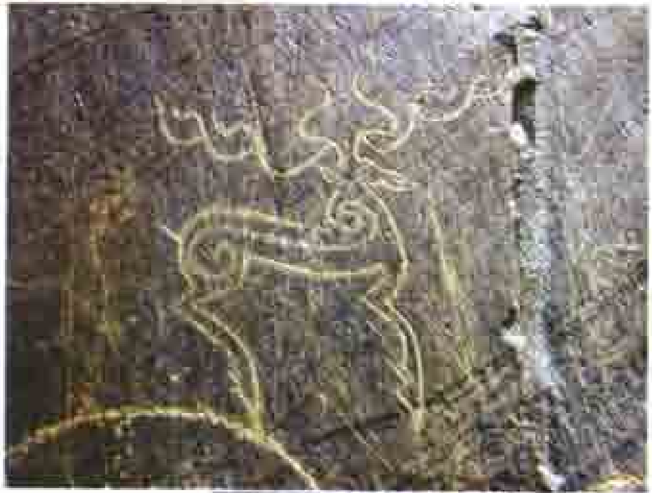
Bruneau, Pl.12: Deers with folded-legs, exact location unknown, Western Tibet. Iron Age, 1st millennium BC. (after Bellezza, 2000)



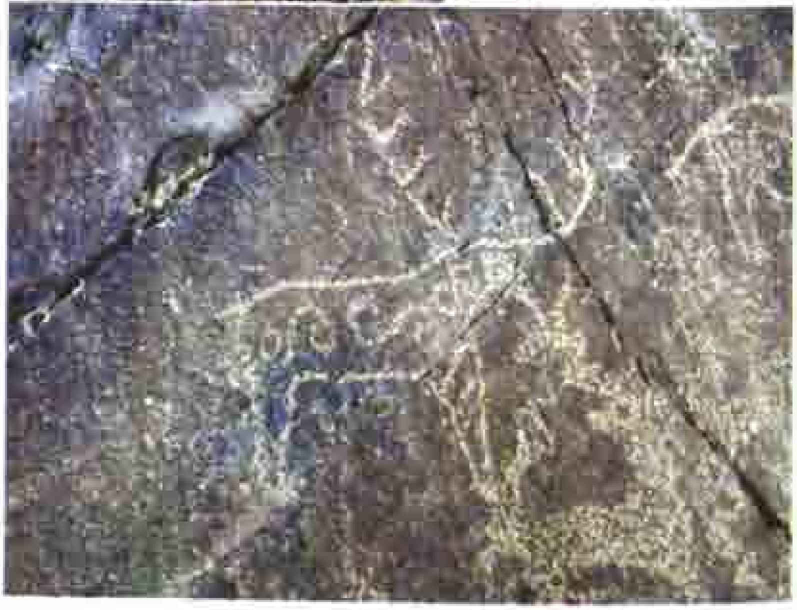
Bruneau, Pl.13: Deer with folded-legs, exact location unknown, Western Tibet. Iron Age, 1st millennium BC. (after Bellezza, 2000)



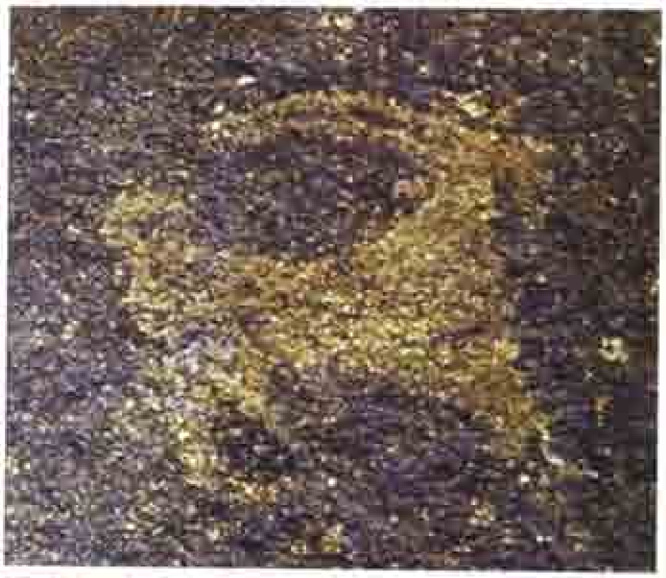
Bruneau, Pl.14: Engraved gazelle at Lurulangka, Rutog district, Western Tibet. Iron Age, first half of the 1st millennium BC (after Li Yongxian and Huo Wei 1994: catalogue no 9)



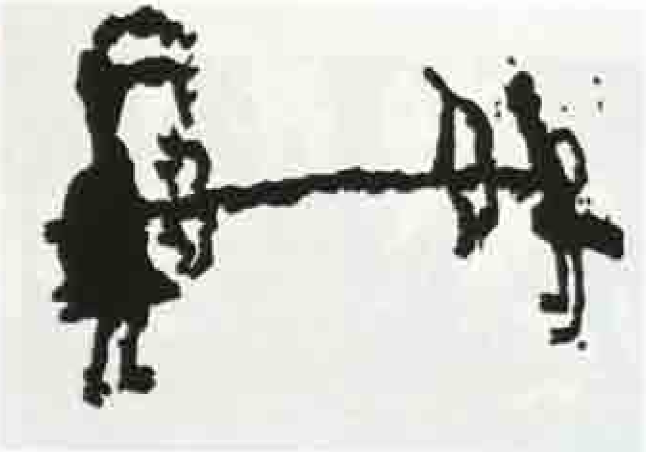
Bruneau, Pl.15: Engraved deer standing on the tips of the hoofs with a 'S ornament' on its body, Rutog district, (Renmudong?), Western Tibet. Iron Age, 8th-5th century BC (after Germano 200- file B4559)



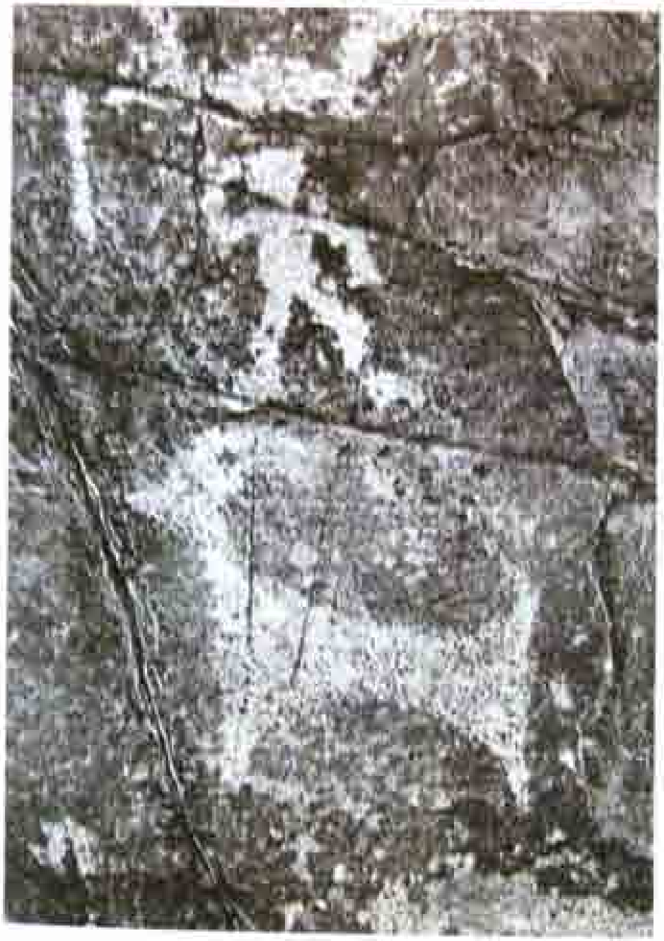
Bruneau, Pl.16: Engraved deer with several 'S ornament' applied at random, Rutog district, (Renmudong?), Western Tibet. Second half of the 1st millennium BC (after Germano 200- file B4526)



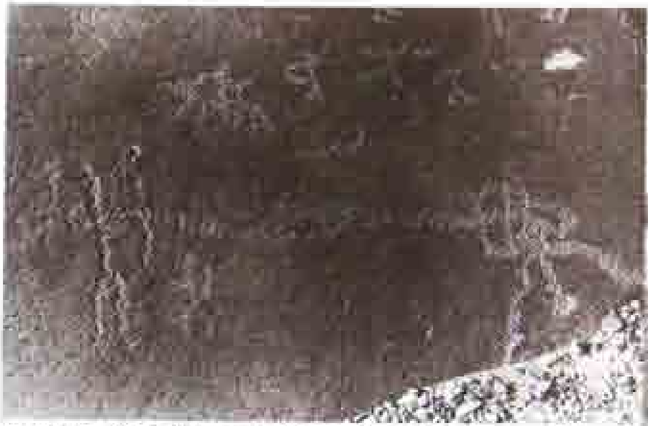
Bruneau, Pl.4: ibex in the bi-triangular style, Taru, Ladakh. Bronze Age. (Photograph by HP Francfort)



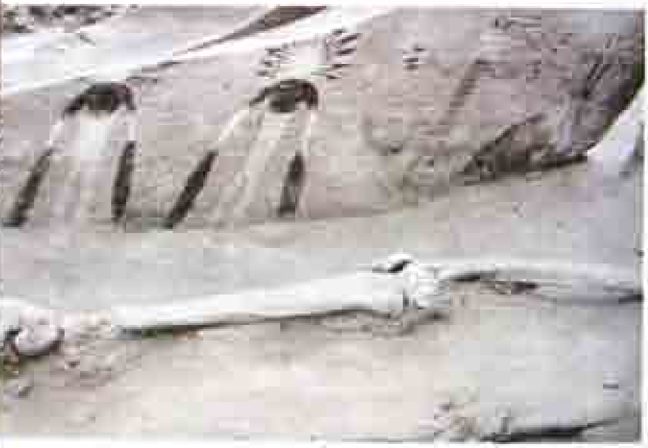
Bruneau, Pl.6: duel scene, Leh road (towards Alchi and Khalsi), Ladakh. Bronze Age. (after Tucci's 1935 expedition, in Orofino 1990: fig.24)



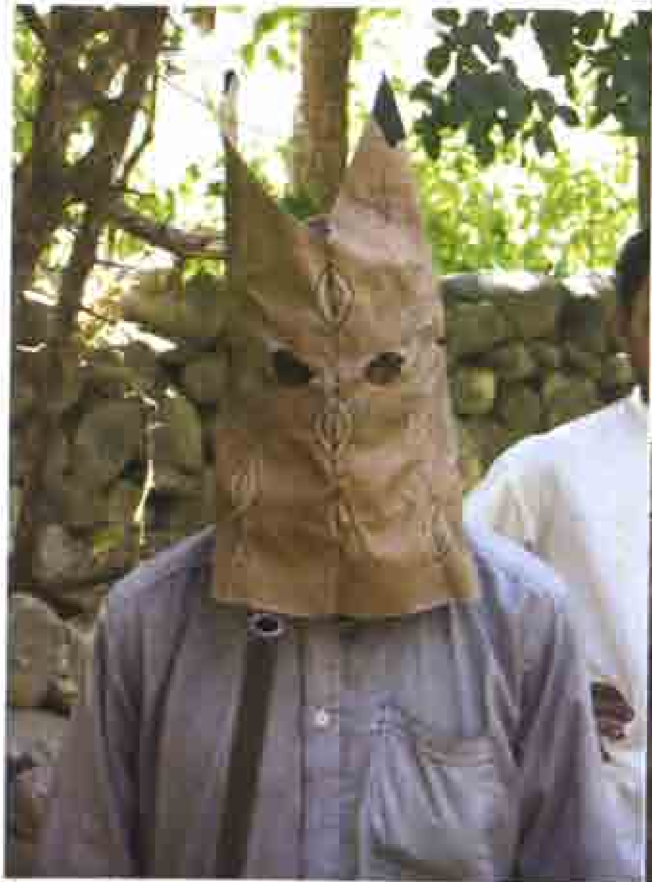
Bruneau, Pl.5: ibex in the bi-triangular style, Char, Ladakh. Bronze Age. (after Linrothe 1999: n°10)



Bruneau, Pl.7: duel scene, Mongolian Altai: Tsaagan Salaa I, Bronze Age. (after www.epistemes.net/petro/index.php)

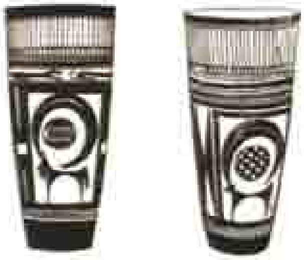


Bruneau, Pl.9: Painted grave slab from Karakol, Altai (3rd millennium/ beginning of the 2nd millennium BC). (Photograph by VD Kubarev, in Francfort 1994: fig.15)



Bruneau, Pl.8: present-day hunter wearing a 'horned mask', Upper Indus Valley, Pakistan. (Photograph by the author)

Bruneau, Pl.10: Two dancing figures with 'feathered' hands and headresses. Exact location unknown, Western Tibet. (after Bellezza 1999: fig.10)



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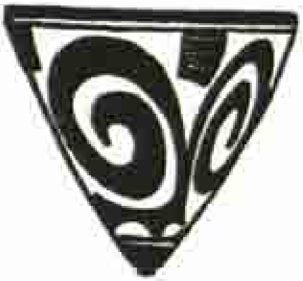
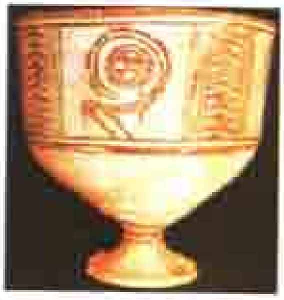
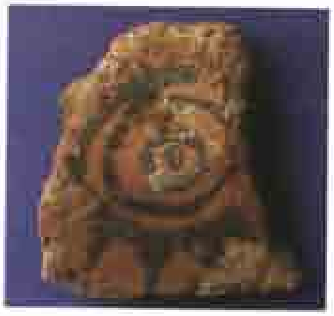


Tele Bakun



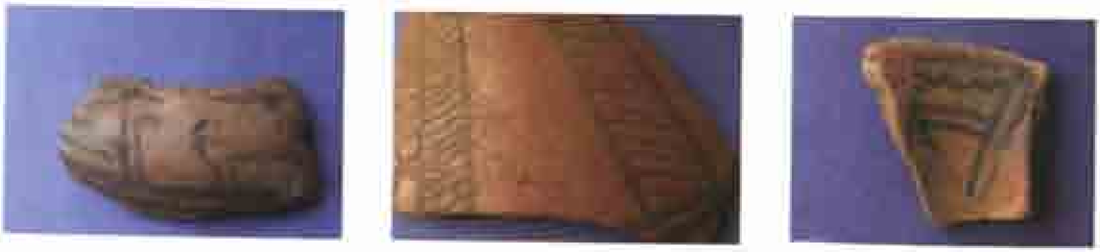
Tepe Hissar



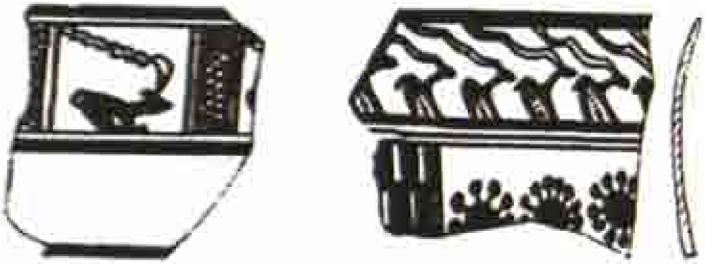
Navdatoli

Animals with Sun Motif bet. Their Horns

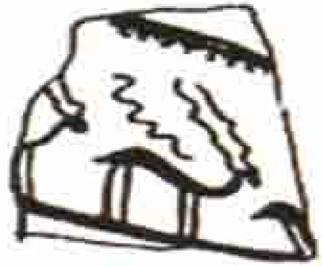
Rounaghi and Shinde, **Pl. 3:** Animal motifs on Iranian pottery



Navadatoli Wavy Horned Animals

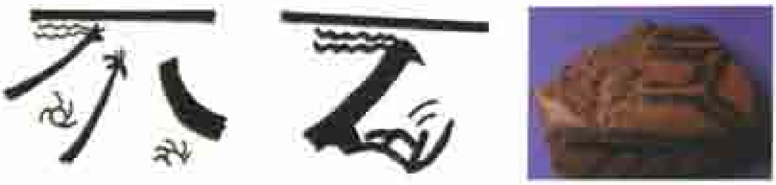


Sialk Wavy Horned Animals



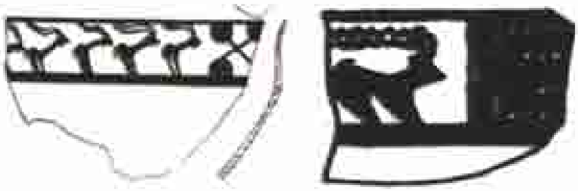
Mehargarh Wavy Horned Animals

Rounaghi and Shinde, **Pl. 4:**



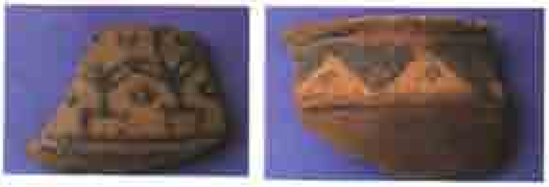
Navdatoli, Malwa ware, Wavy Horned Animals

Rounaghi and Shinde, Pl 5: Animal motifs on Indian pottery

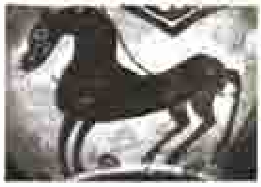


Sialk, Wavy Horned Animals

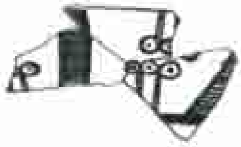
Rounaghi and Shinde, Pl. 6: Similar animals painted on Iranaian and Indian pottery



Navdatoli, Malwa Culture- India



Tepe Sialk, Iran



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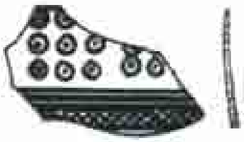

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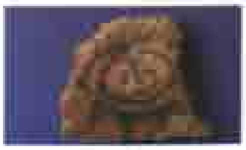
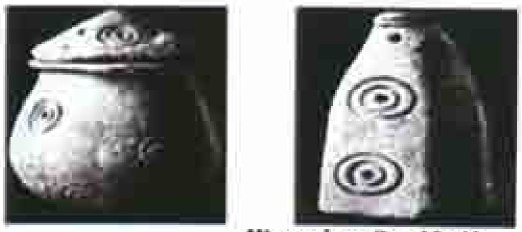
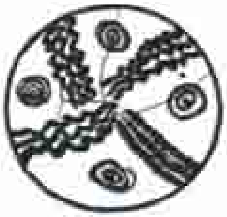
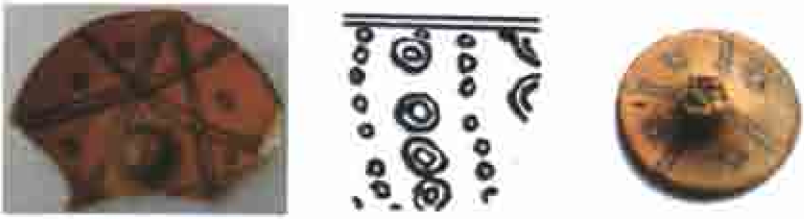


Navdatoli



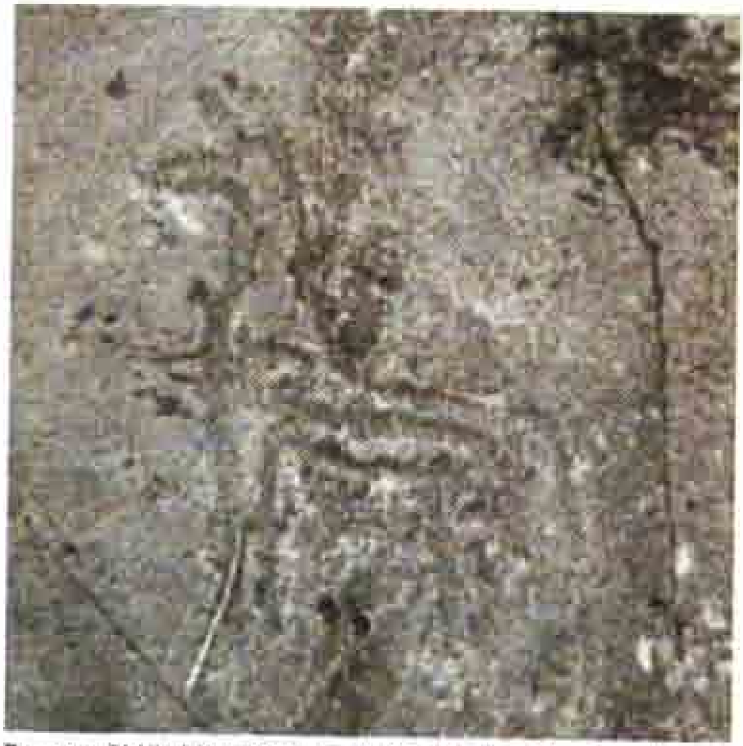
Hissar, Iran Sun Motifs



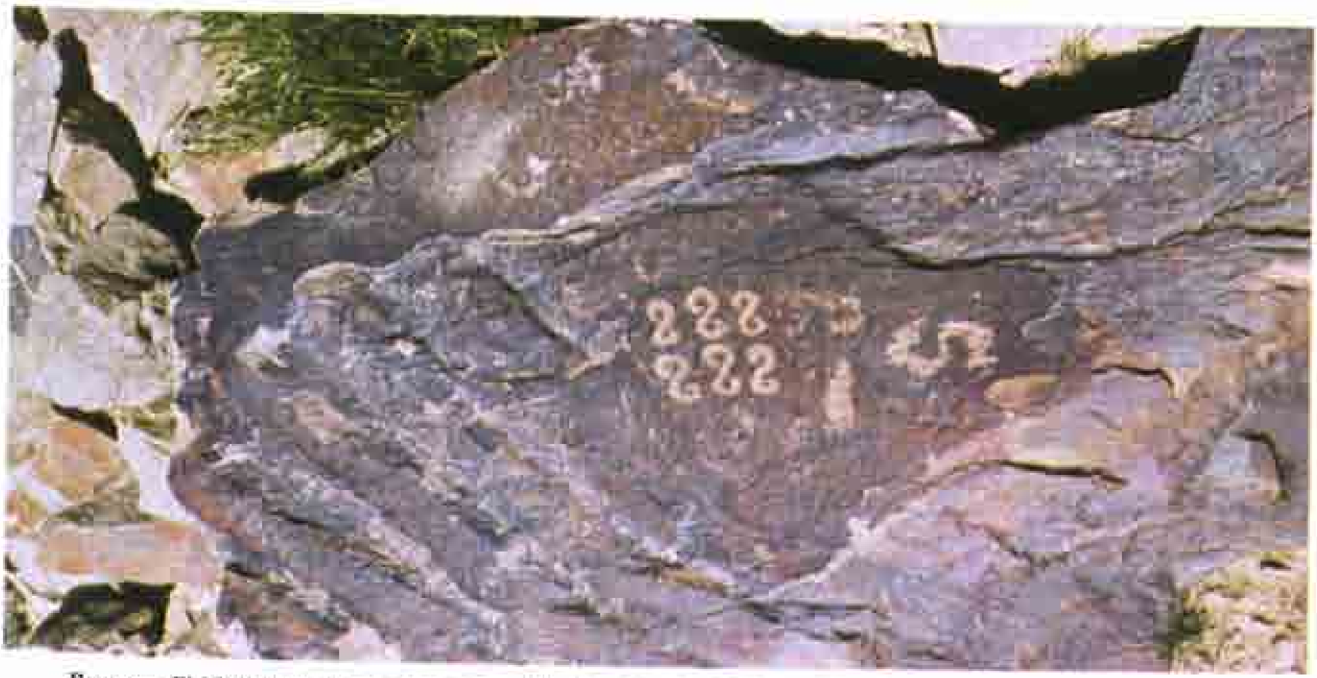


Navdatoli, Malwa Ware, Sun Motifs

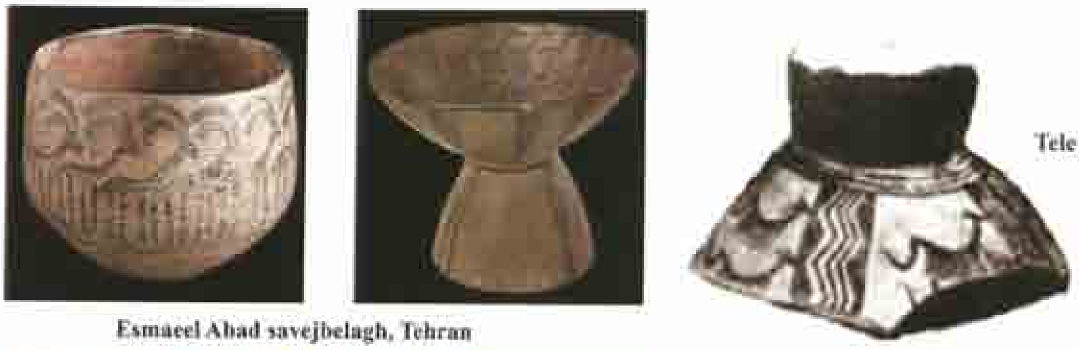
Rounaghi and Shinde, Pl. 7: Some similar motifs on Iranian and Indian pottery



Bruneau, Pl.17: Engraved representation of a dog with a 'S' marking its body, Rwa 'brog 'phrang, Rutog district, Western Tibet. Second half of the 1st millennium BC (after Bellezza, 2001: fig.10.69)

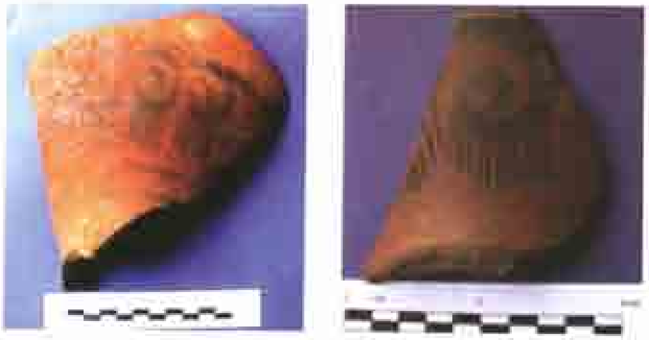


Bruneau, Pl.18: Engraved 'independent S motif', Char, Zanskar. Mid-1st millennium BC (Photograph by D Klodzinski)



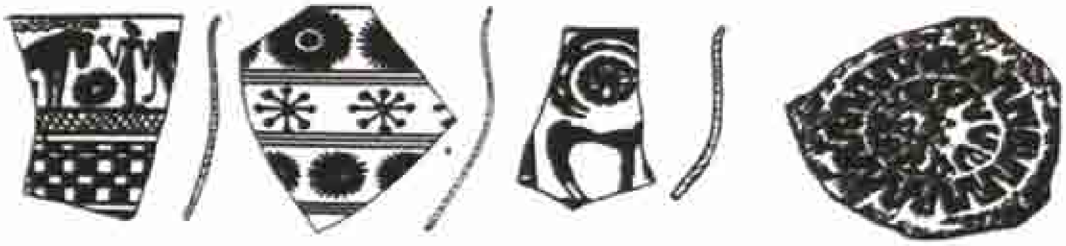
Tele Gap Marv Dasht

Esmaeel Abad savejbelagh, Tehran

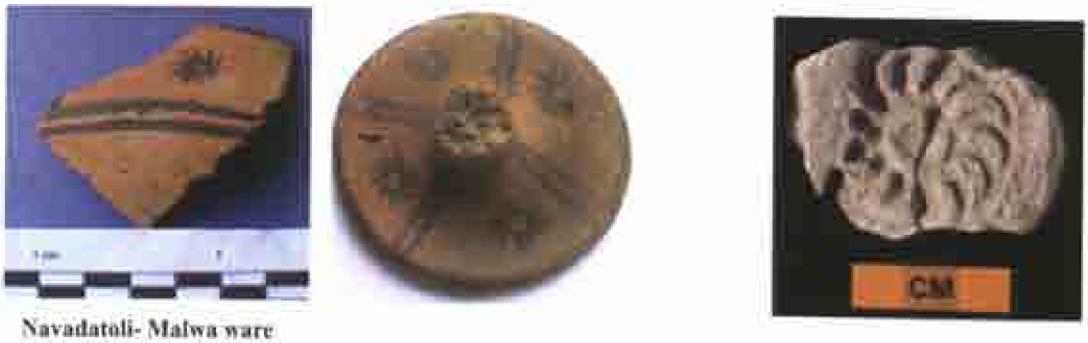


Navadatoli- Malwa ware

Rounaghi and Shinde, Pl. 1. Comb Animals, Iran & India



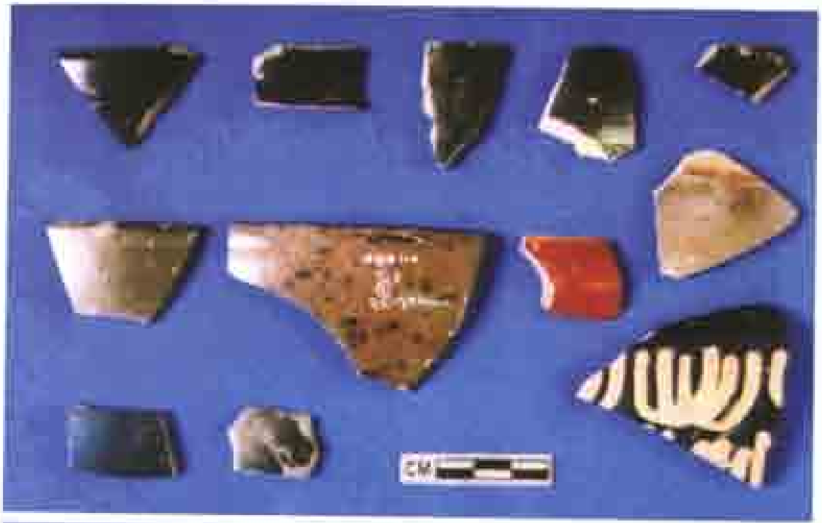
Tepe Sialk Pottery & Seal Impression



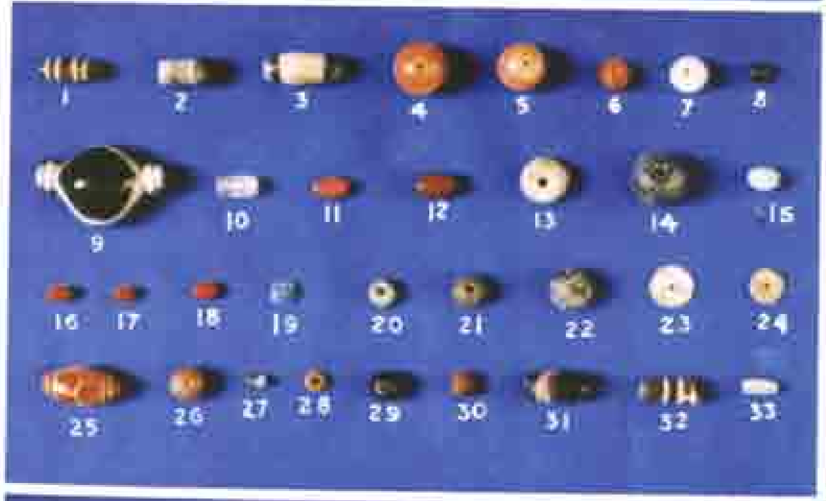
Gilund, Seal Impression

Navadatoli- Malwa ware

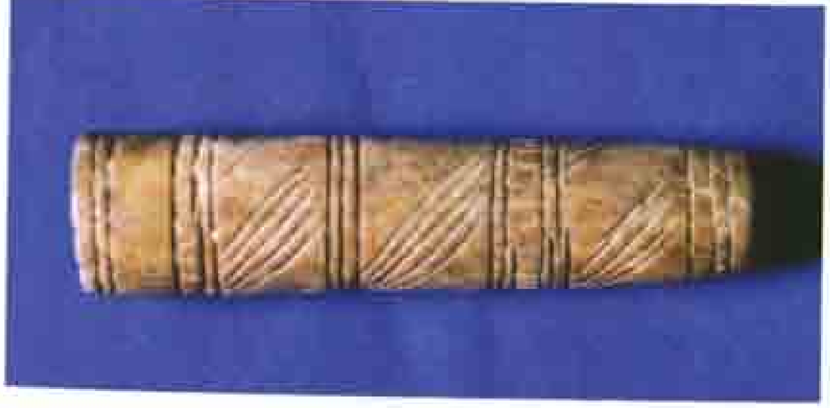
Rounaghi and Shinde, Pl. 2: Sun motifs on Indian and Iranian pottery showing similarity



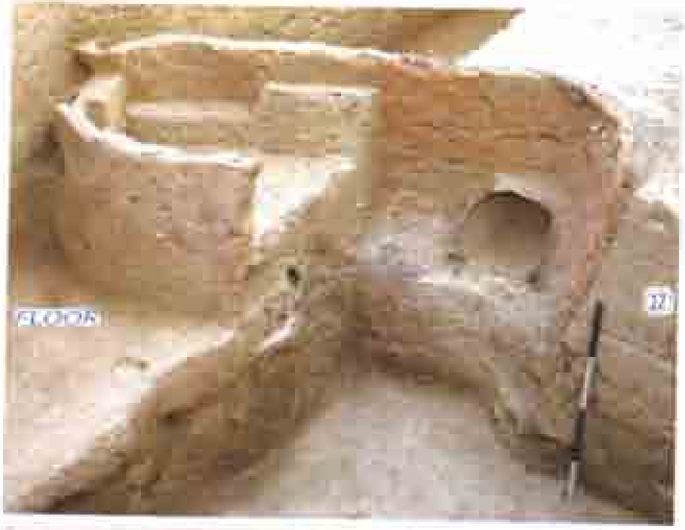
Tripathi and Upadhyay, Agiabir, Pl.1: NBPW Potsherds, Period III



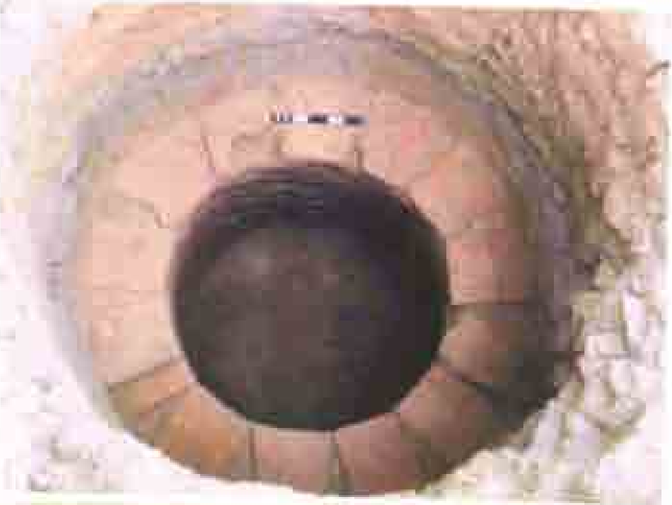
Tripathi and Upadhyay, Agiabir, Pl.2: Beads, Pd. II: 1, Pd. III: 2-15, Pd. IV: 16-29, Pd. V: 30-33.



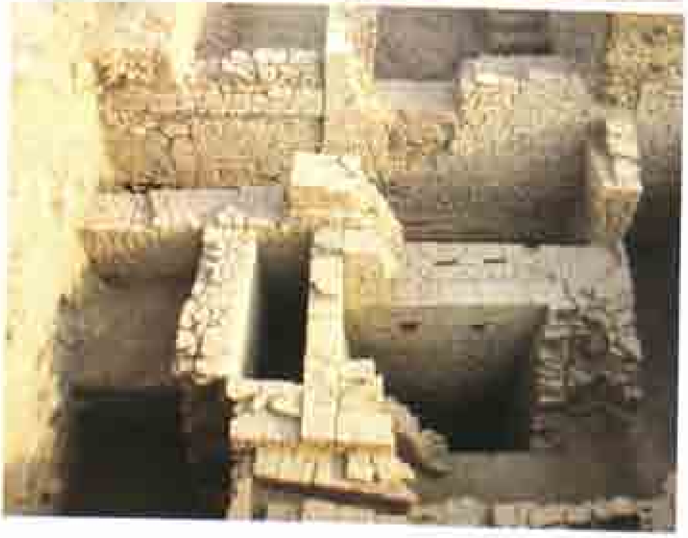
Tripathi and Upadhyay, Agiabir, Pl.3: Ivory handle, Period III



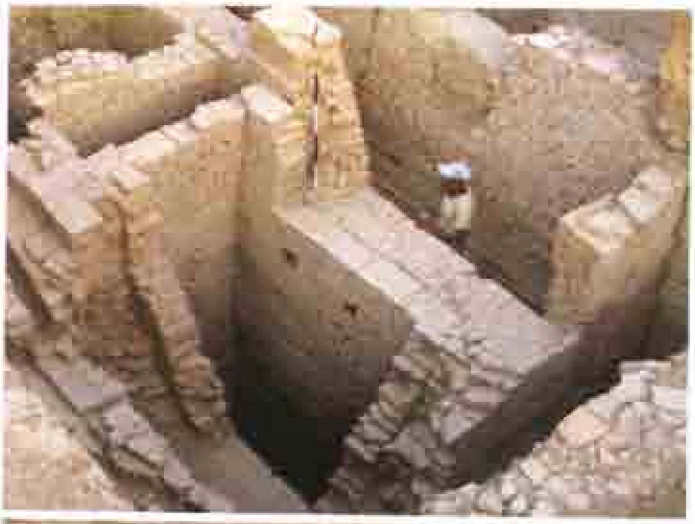
Tripathi and Upadhyay, Agiabir, Pl.4: Kiln of Period III



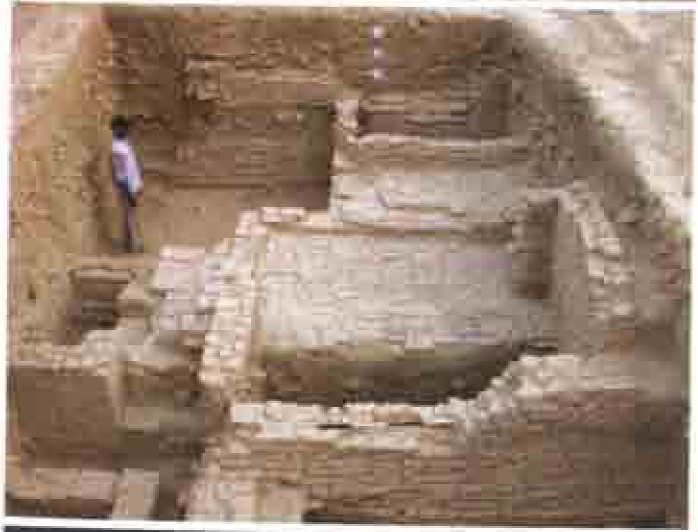
Tripathi and Upadhyay, Agiabir, Pl.5: Close up view of the well, Period IV



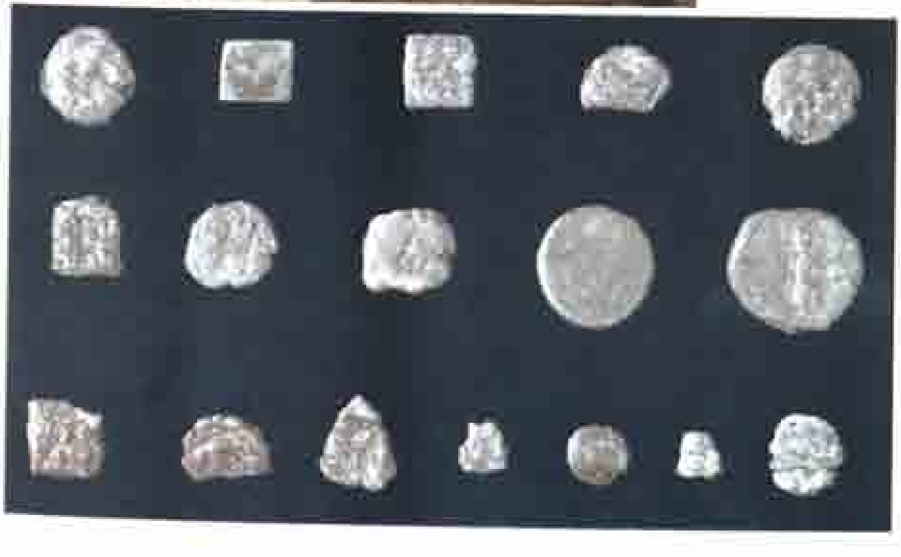
Tripathi and Upadhyay, Agiabir, Pl.6: Structural remains of locality 2



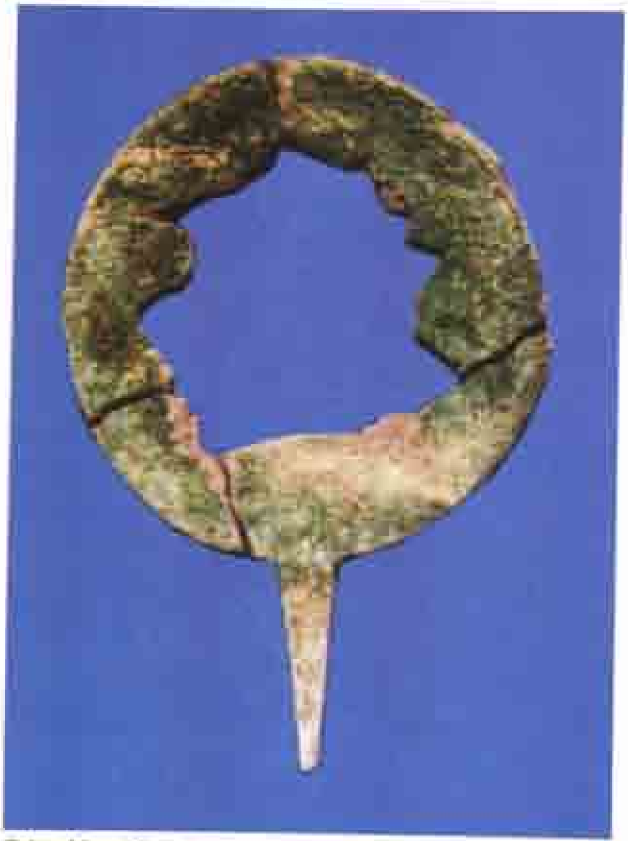
Tripathi and Upadhyay, Agiabir, Pl.7: Close up view of the underground structure, Period IV



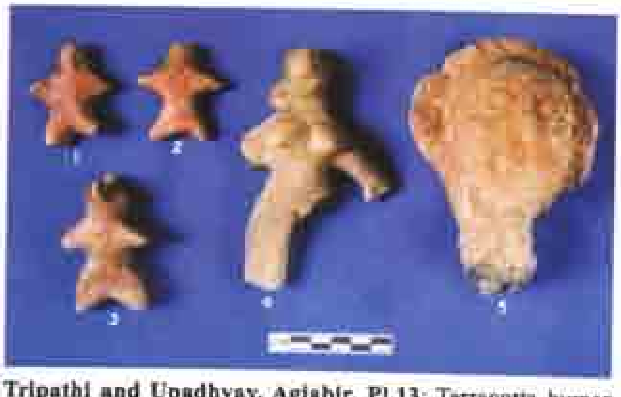
Tripathi and Upadhyay, Agiabir, Pl.8: Structural remains of locality 3



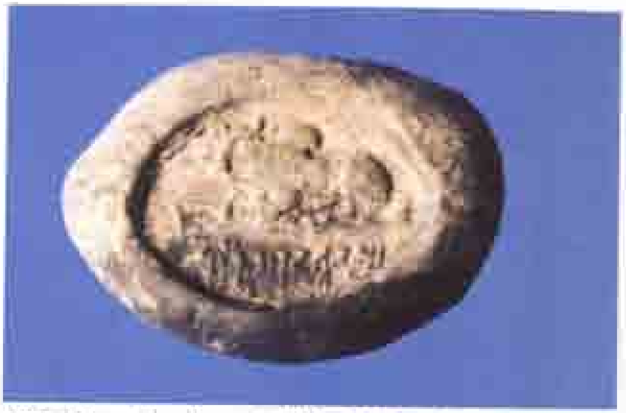
Tripathi and Upadhyay, Agiabir, Pl.9: Copper coins, Period IV and V



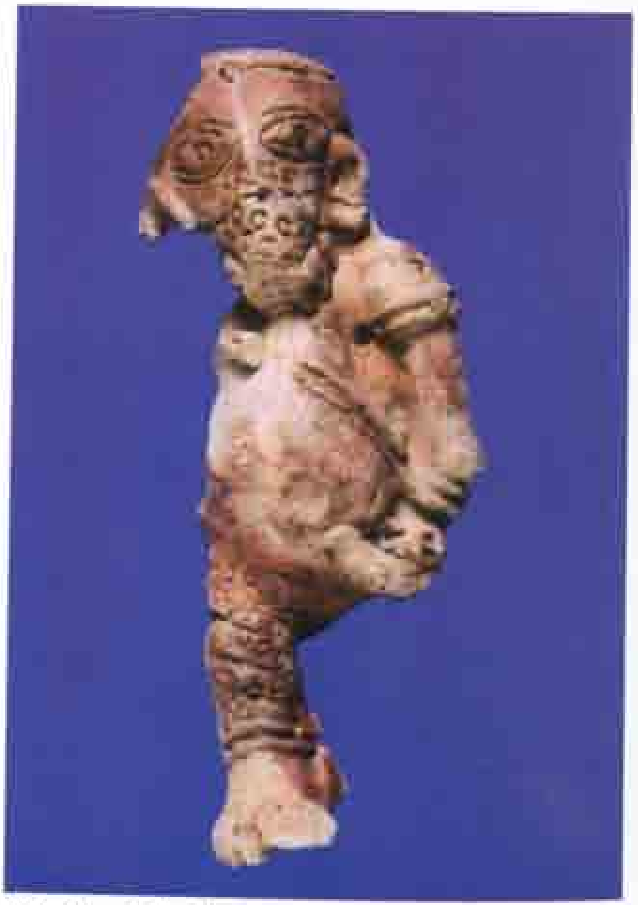
Tripathi and Upadhyay, Agiabir, Pl.10: Copper mirror, Period IV



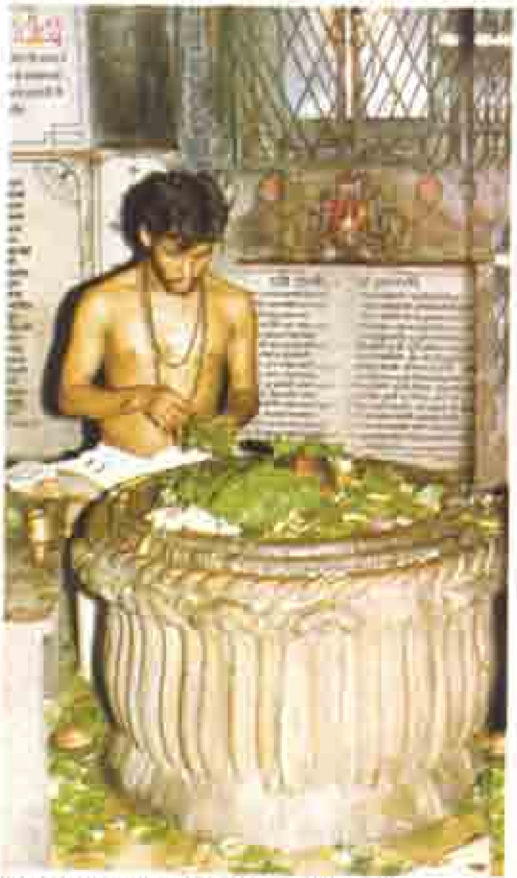
Tripathi and Upadhyay, Agiabir, Pl.13: Terracotta human figurine, Period V



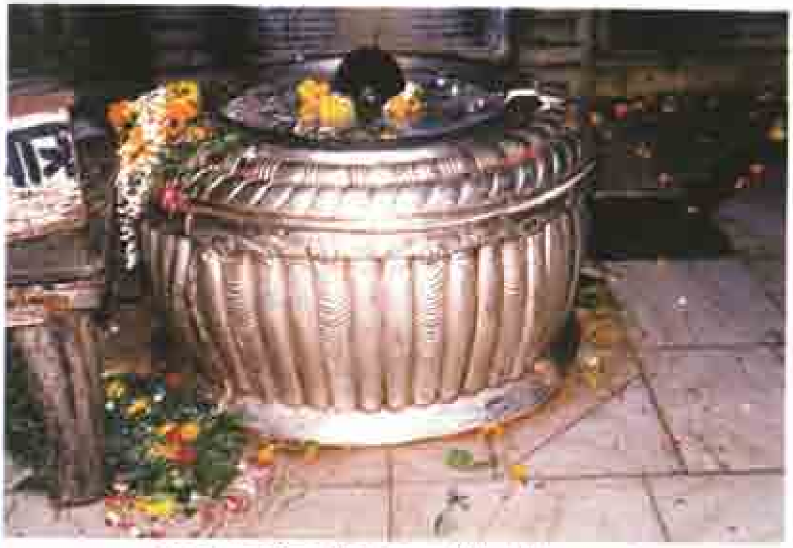
Tripathi and Upadhyay, Agiabir, Pl.11: Sealing of baked clay, Period V.



Tripathi and Upadhyay, Agiabir, Pl.12: Terracotta figurine - *Ganesha*, Period V



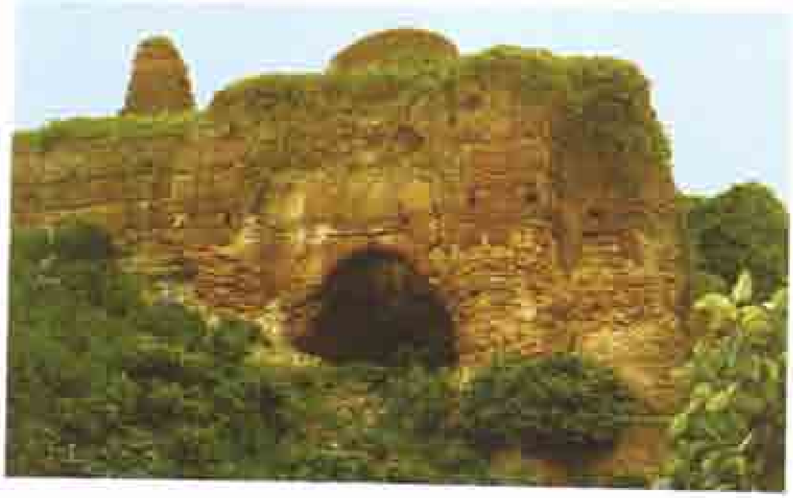
Mani, Ayodhya, Pl.1 : Linga Pitha (Nagesvara), Ayodhya (1995)



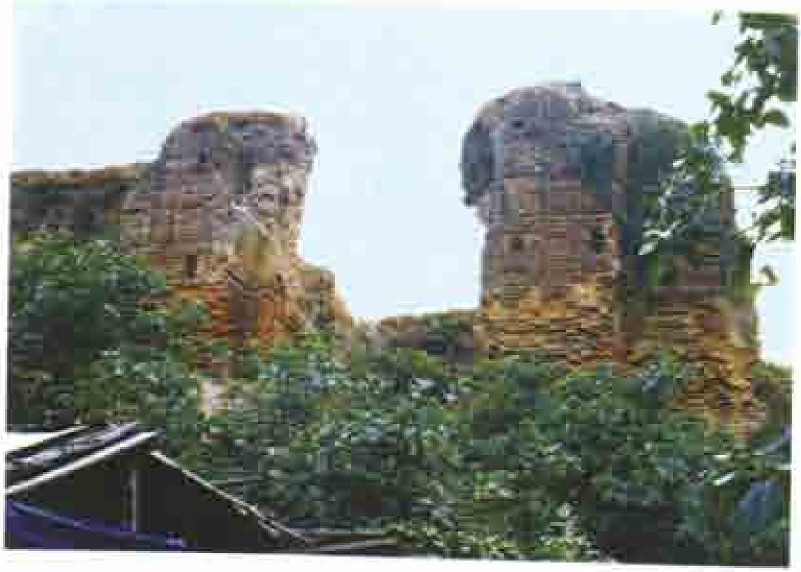
Mani, Ayodhya, Pl.2: Linga Pitha (Nagesvara)

Mani, Ayodhya, Pl.3: Ayodhya inscription (1995)

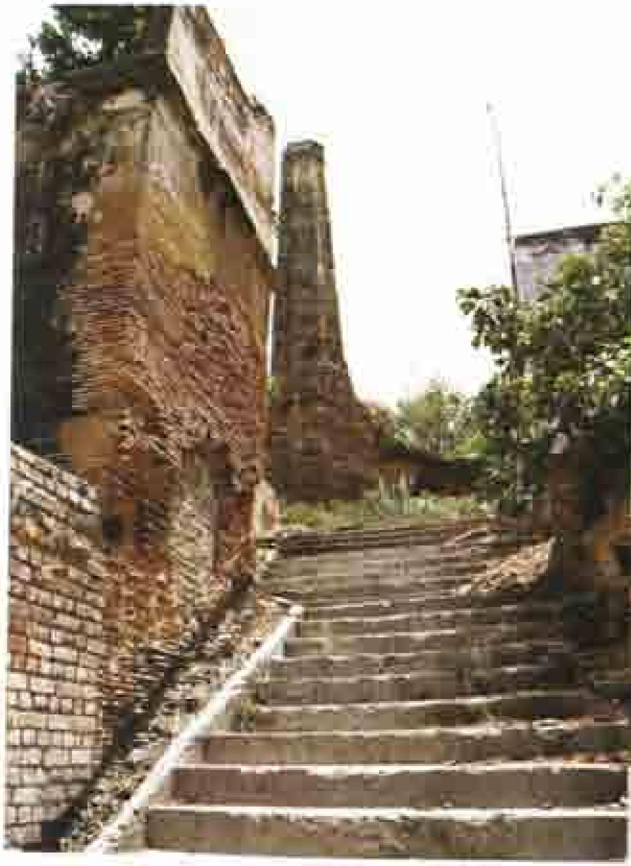
Mani, Ayodhya, Pl.4: Ayodhya inscription (2005)



Mani, Ayodhya, Pl.5: Mosque at Treta- Ke-Thakur



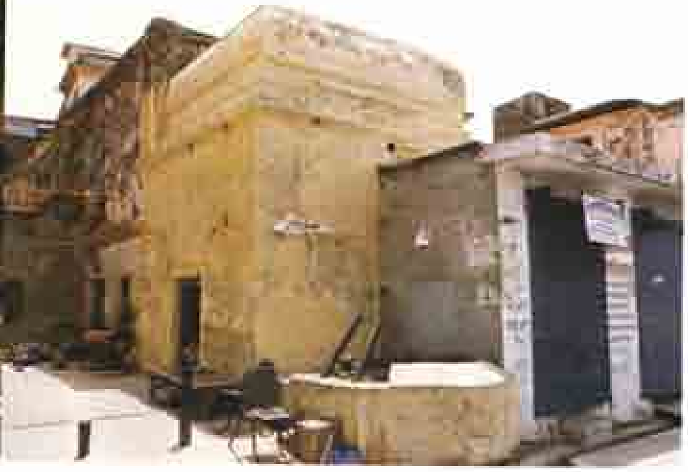
Mani, Ayodhya, Pl.6: Mosque at Treta- Ke-Thakur

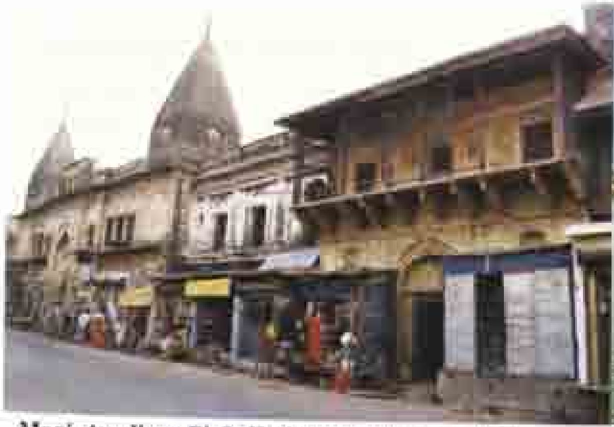


◀ **Mani, Ayodhya, Pl.7:** Mosque near Chandrahari Temple (2005)

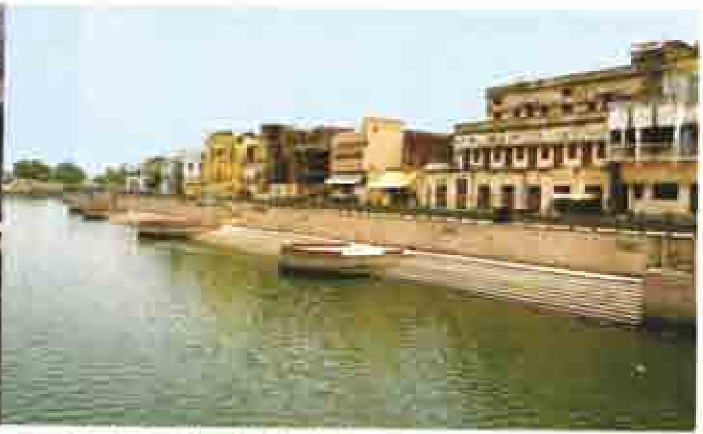
Mani, Ayodhya, Pl.8: New Additions replacing heritage structures

▼





Mani, Ayodhya, Pl. 9: Heritage Structures on Highway



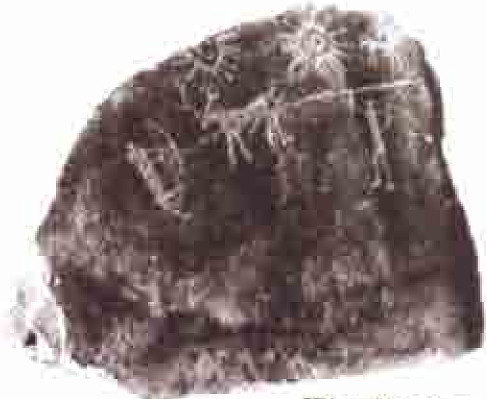
Mani, Ayodhya, Pl. 10: Heritage Structures on riverfront

Fonia and Chakraborty, Pl.1: Malpur Stone Tools

Fonia and Chakraborty, Pl.2: Malpur Stone Tools

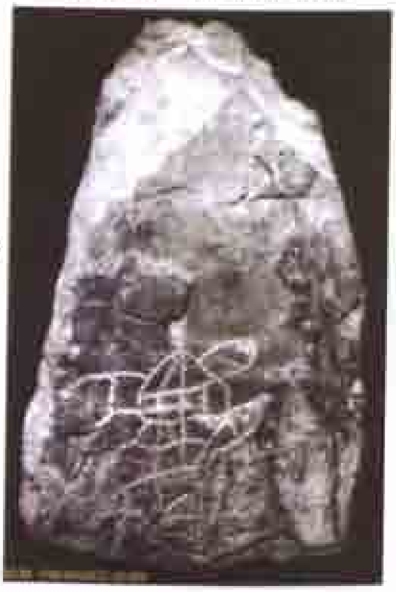
Fonia and Chakraborty, Pl.3: Malpur Stone Tools

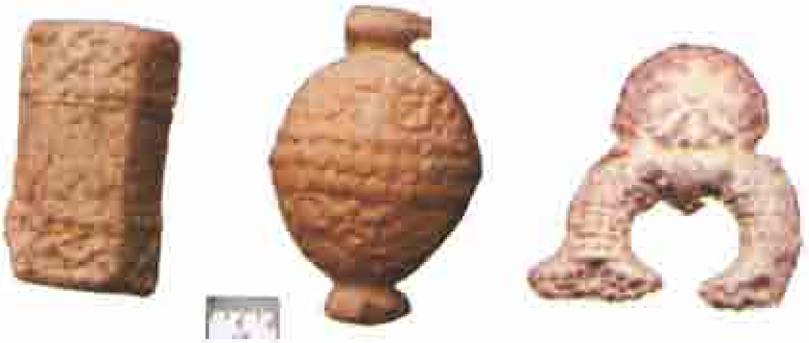
Fonia and Chakraborty, Pl.4: Malpur Stone Tools



Fonia and Chakraborty, Pl.5: BZM hunting Scene

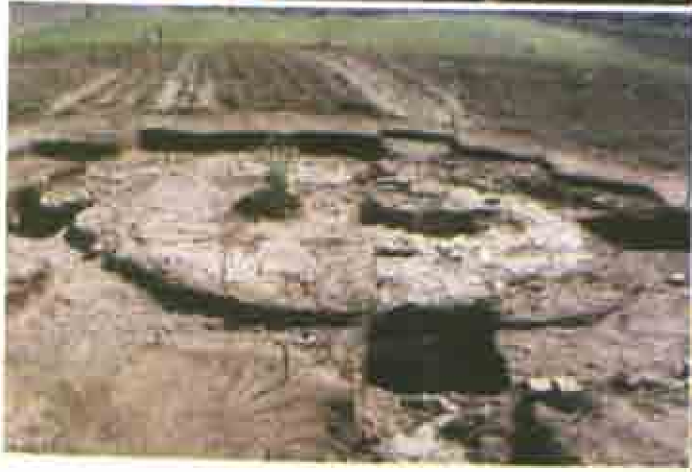
Fonia and Chakraborty, Pl.6: BZM engraved Slab



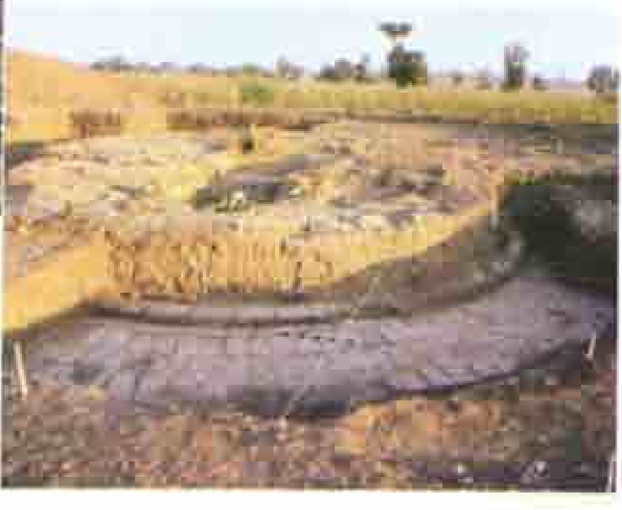


Deotare, ***et al.*****, Bhon, Pl. 1:** Decorated terracotta bead, pendants, similar to Bharhut

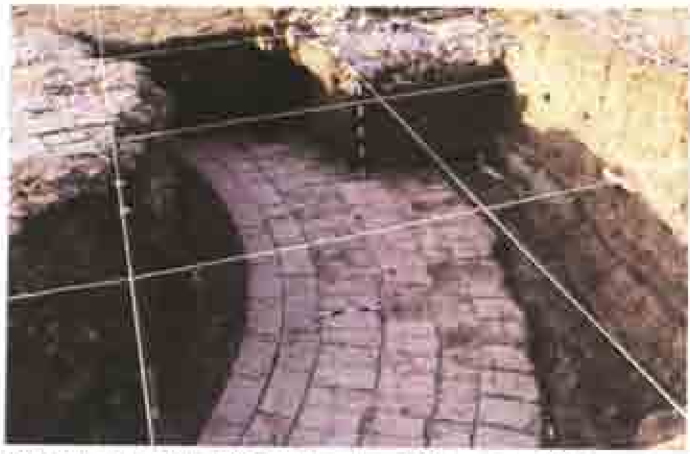
Deotare, ***et al.*****, Bhon, Pl. 2:** A part of exposed stupa (2003), earlier identified as a part of fortification wall



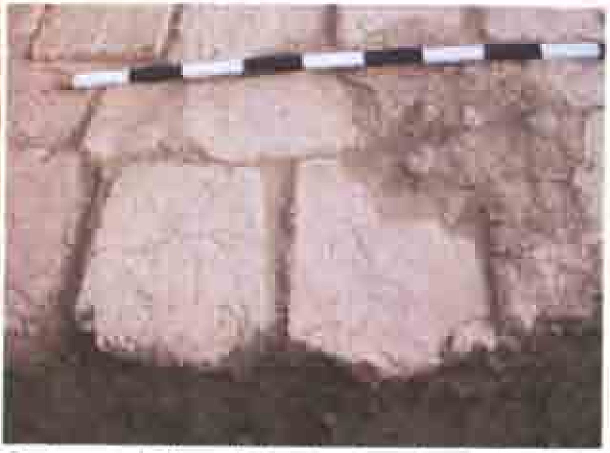
Deotare, *et al.*, **Bhon, Pl. 3:** Outline of the stupa exposed during 2005



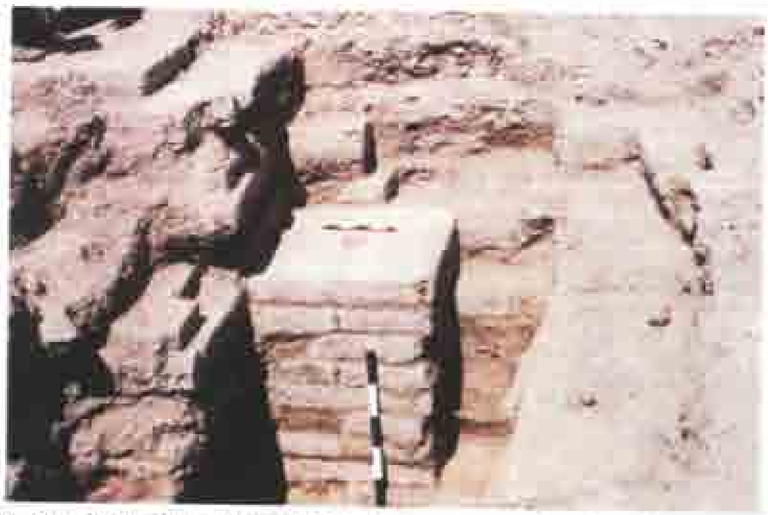
Deotare, *et al.*, **Bhon, Pl. 4:** Completely exposed stupa



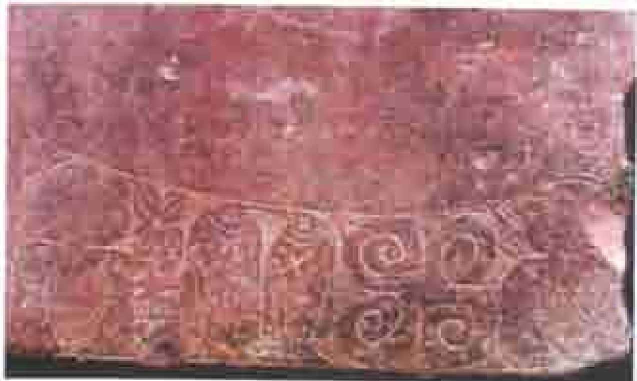
Deotare, *et al.,* **Bhon, Pl. 5:** Exposed *pradkshina patha* in NW quadrant of the stupa



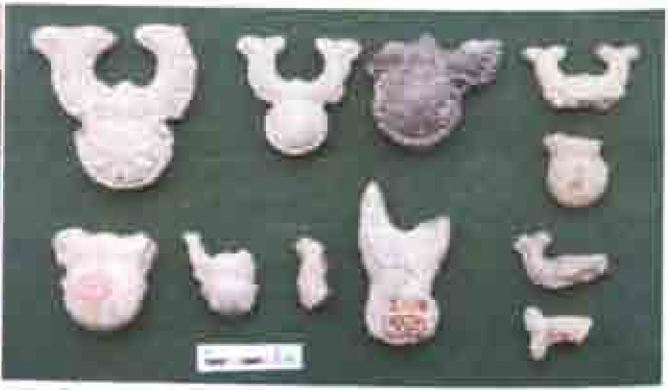
Deotare, *et al.,* **Bhon, Pl. 6:** Close view of symbol on brick



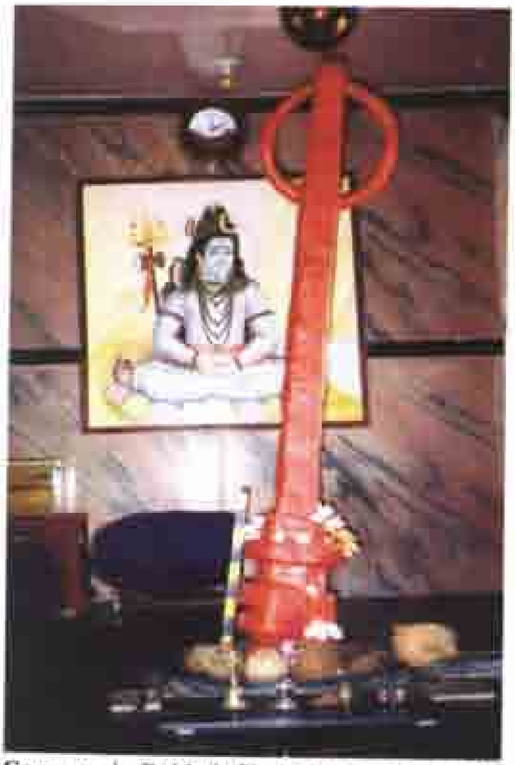
Deotare, *et al.,* **Bhon, Pl. 7:** Close view of aligned brick structure in central portion of the stupa with a hole for *yashti*



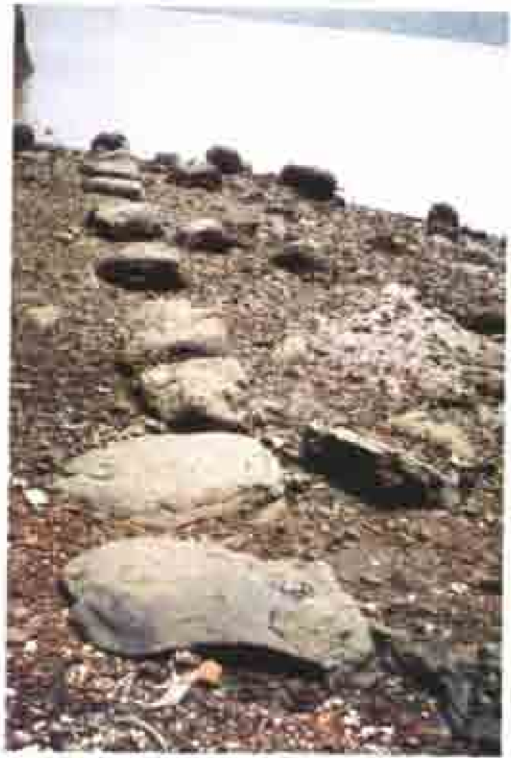
Deotare, *et al.,* **Bhon, Pl. 8:** Legged quern with engraved auspicious symbols



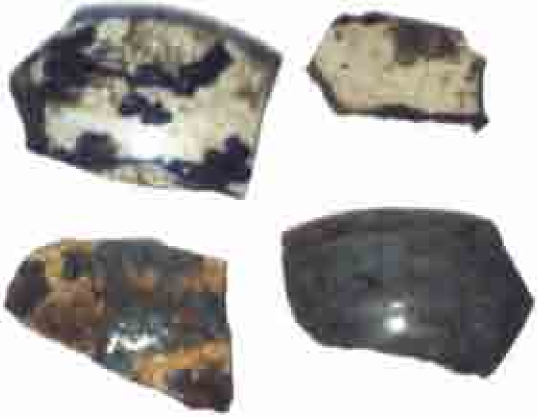
Deotare, *et al.,* **Bhon, Pl. 9:** Decorated *tri-ratna* (taurine)



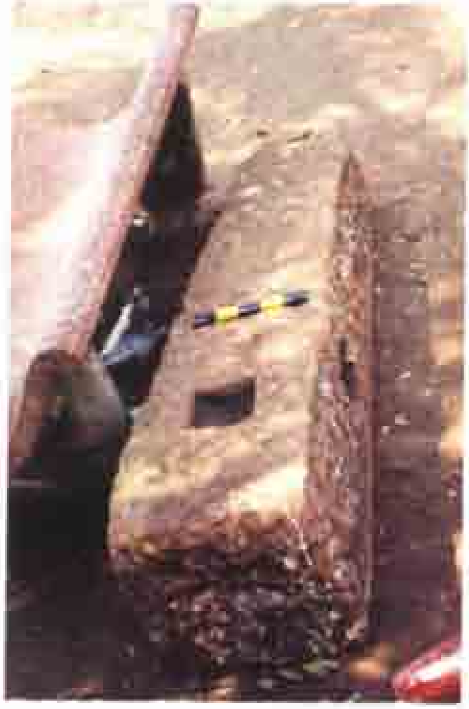
Gaur *et al.*, **Dabhol, Pl. 1:** Iron anchor in the sanctum of the temple Loyaleshwar situated closed to Dabhol jetty.



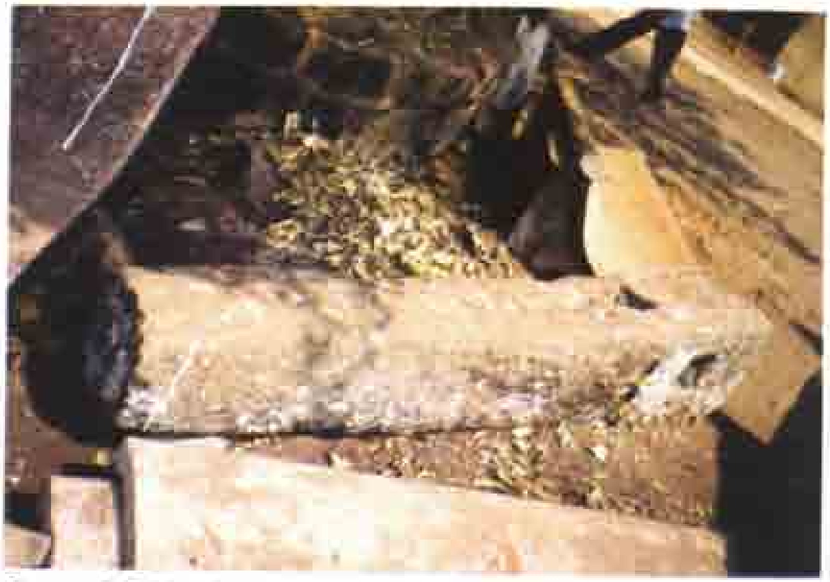
Gaur *et al.*, **Dabhol, Pl. 2:** Remains of an ancient jetty in inter zone of Dabhol, close to present Dabhol jetty.



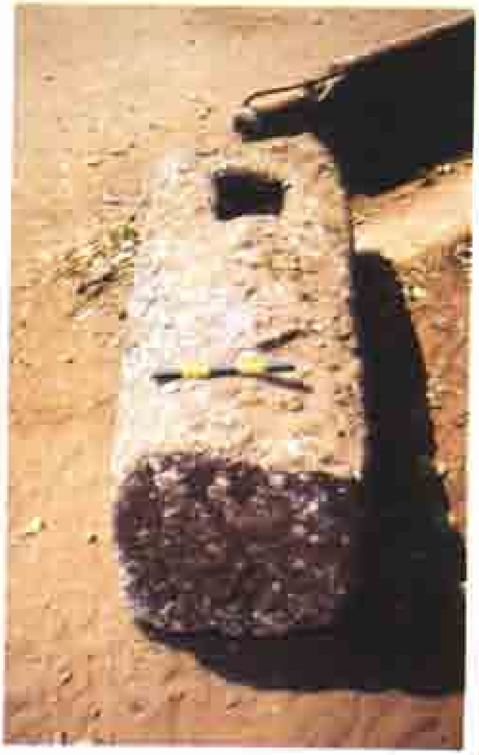
Gaur *et al.*, **Dabhol, Pl.3:**Islamic glazed and Chinese ceramics from Dabhol



Gaur *et al.*, **Dabhol, Pl.4:** Anchor no. 1, presently lying in front of the Port Office

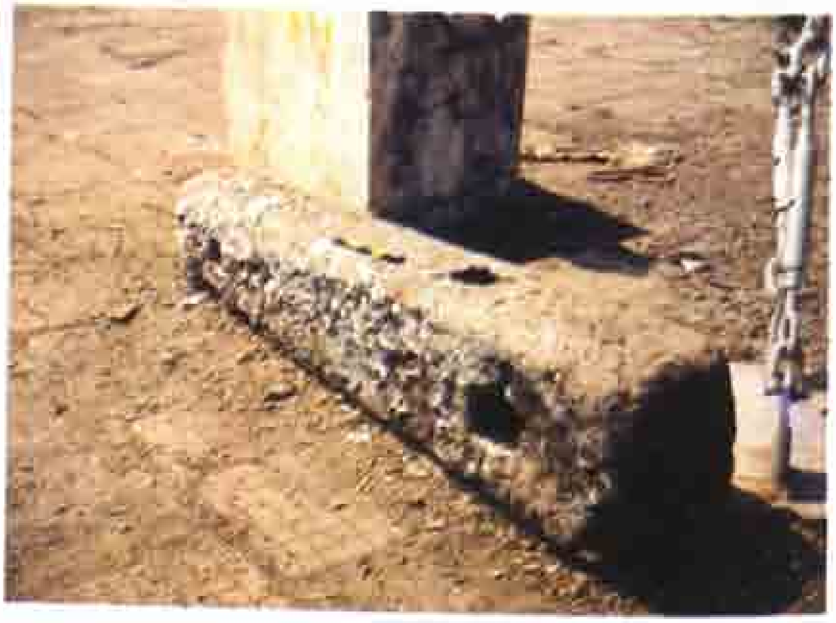


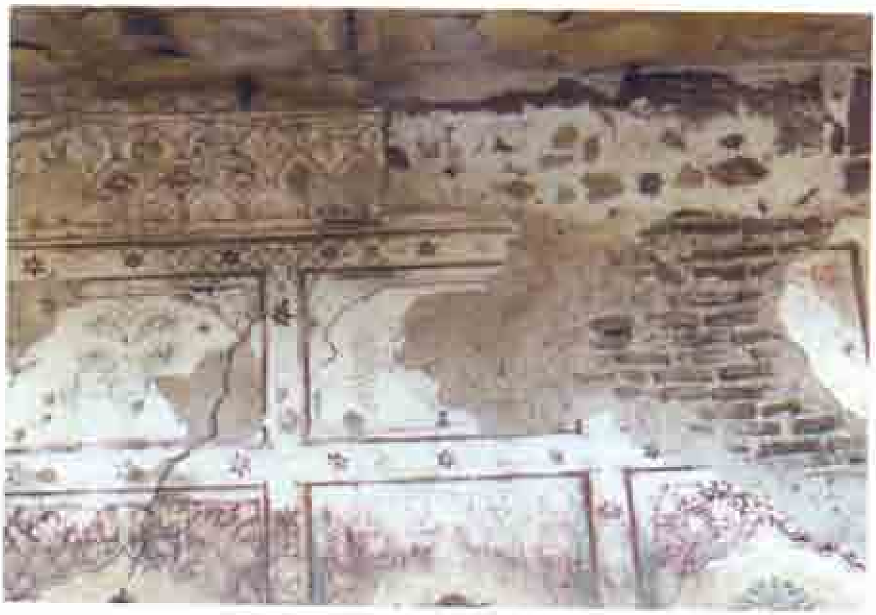
Gaur *et al.*, **Dabhol, Pl. 6:** Anchor no. 3, presently lying in front of the Port Office



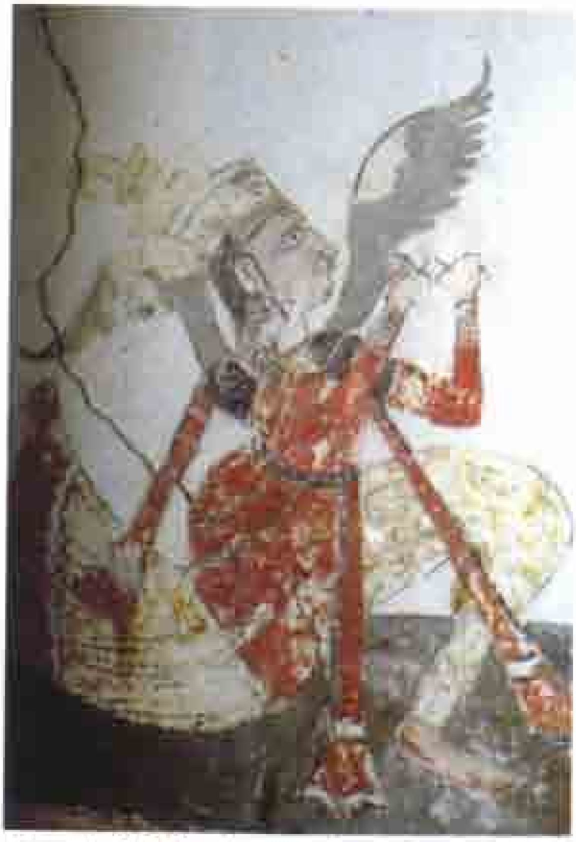
Gaur *et al.*, **Dabhol, Pl. 5:** Anchor no. 2, presently lying in front of the Port Office.

Gaur *et al.*, **Dabhol, Pl. 7:** Anchor no. 4, presently lying in front of the Port Office.

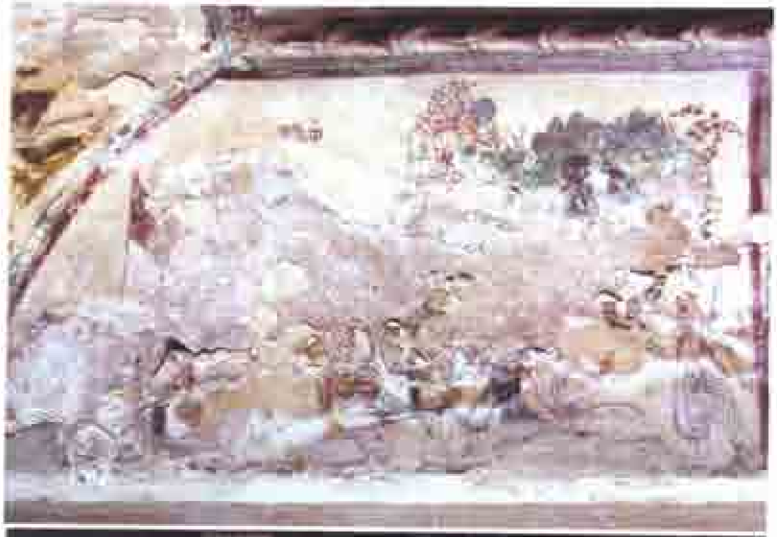




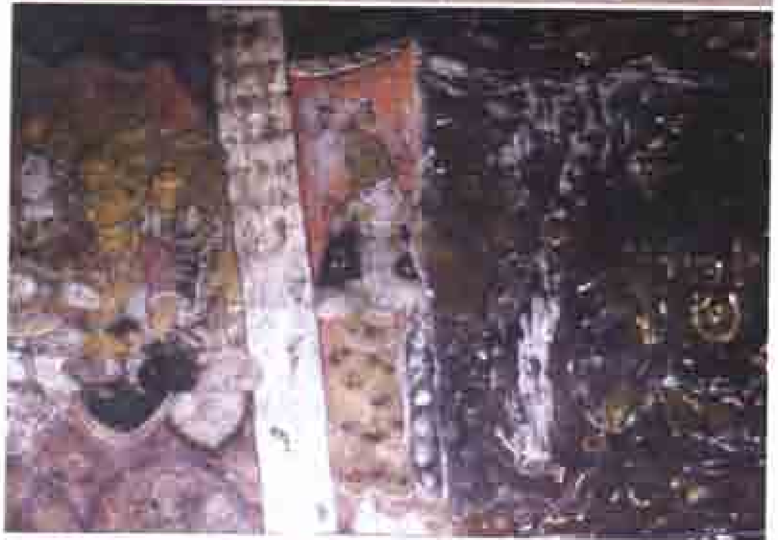
Agrawal, Pl.1: A Chunk of plaster fallen, Nagaur Fort



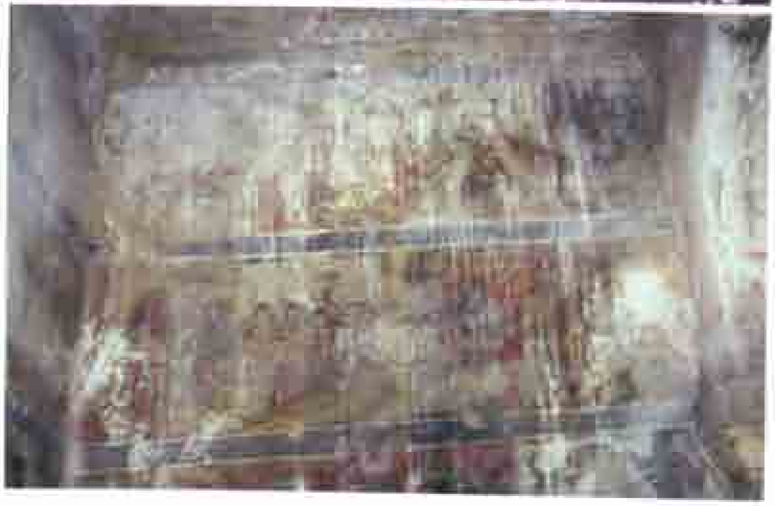
Agrawal, Pl.2: Development of cracks in the painting, Nagaur Fort.



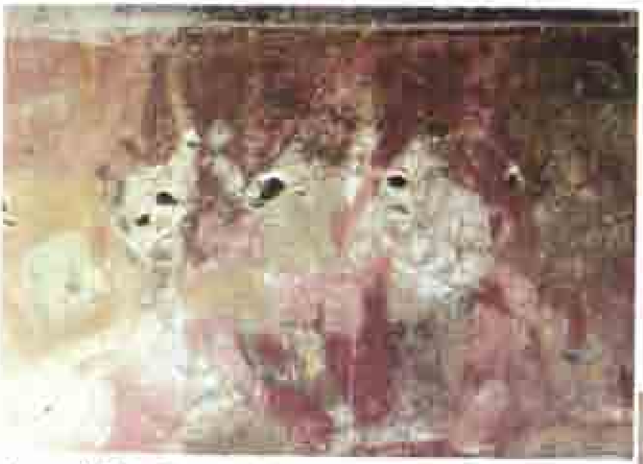
Agrawal, Pl.3: Flaking of paint layer



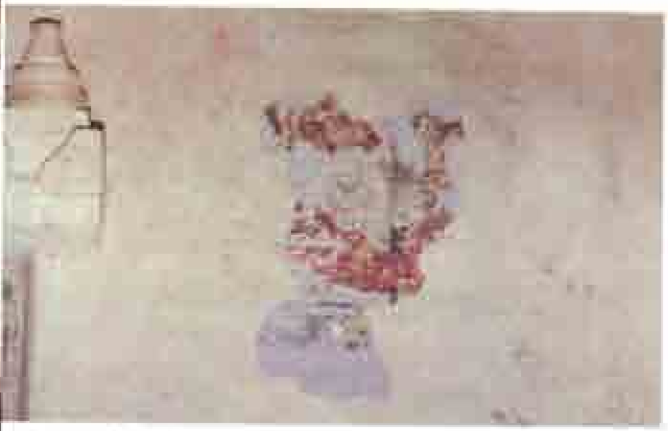
Agrawal, Pl.4: Deposition of smoke on the surface of painting



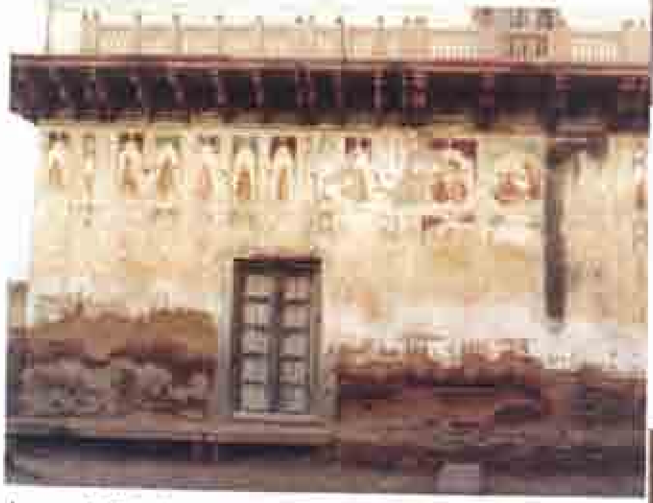
Agrawal, Pl.5: Percolation of rainwater on the painting, Ram Nath Puram Palace



Agrawal, Pl.6: Growth of fungus on the painting, Ram Nath Puram Palace

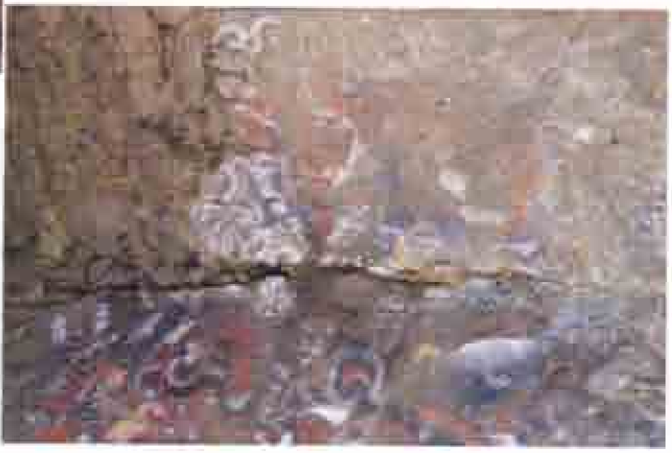


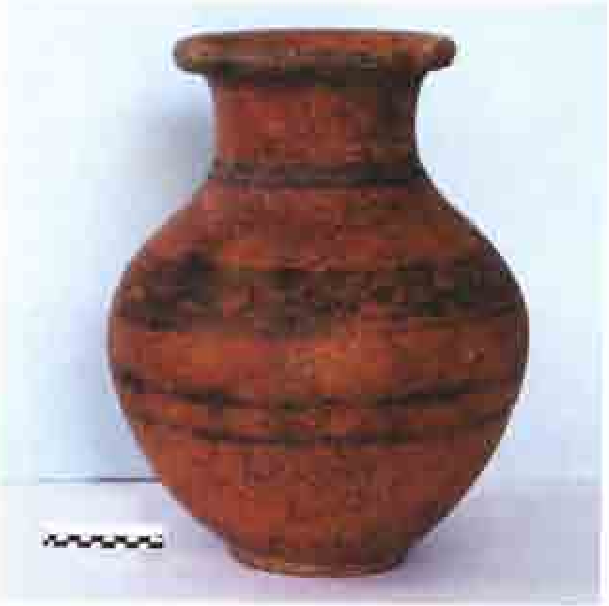
Agrawal, Pl.7: Lime coat hiding the painting, Dilwara Fort, Udaipur



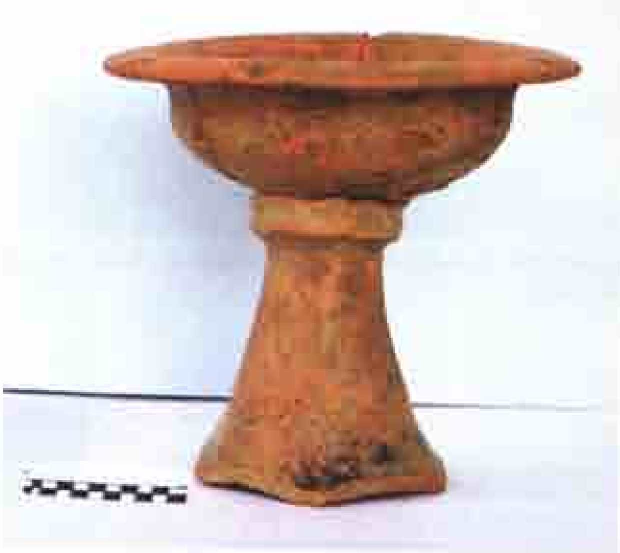
Agrawal, Pl.8: Dampness destroying the painting

Agrawal, Pl.9: Development of deep crack in the wall and plaster

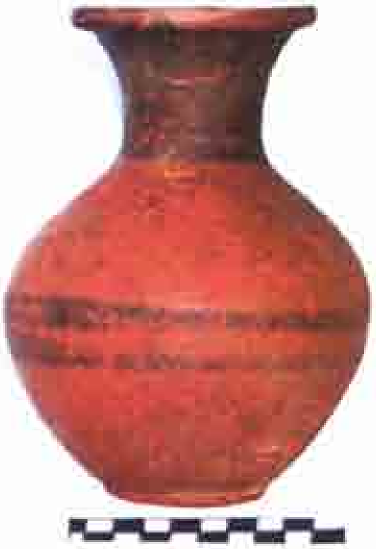




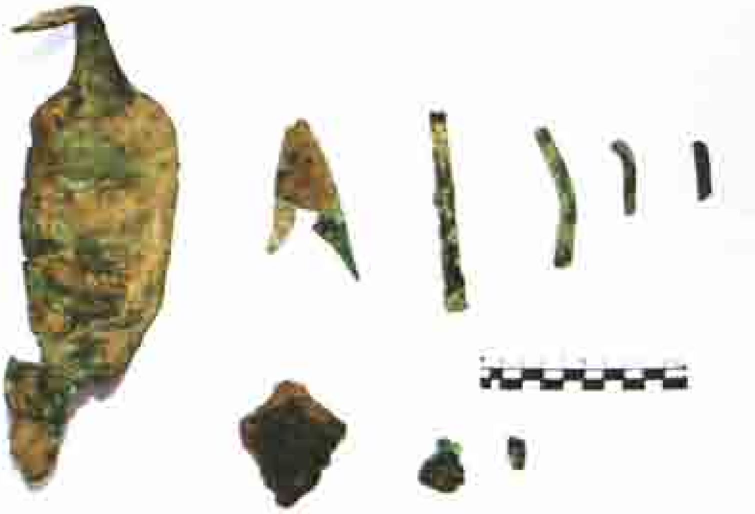
Dangi, Meham, Pl.1: Vase From Bedwa-II (Burial pottery)



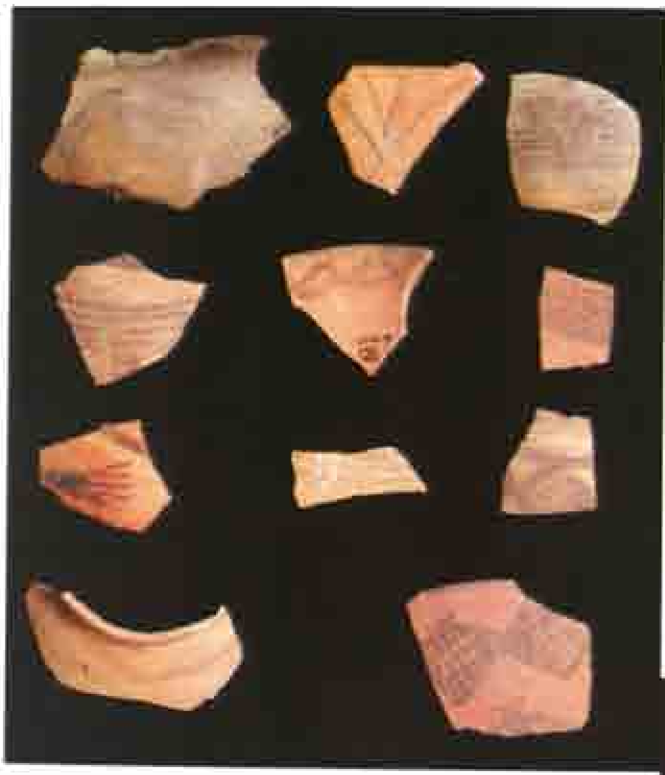
Dangi, Meham, Pl.2: Bowl-on-stand from Bedwa-II (Burial pottery)



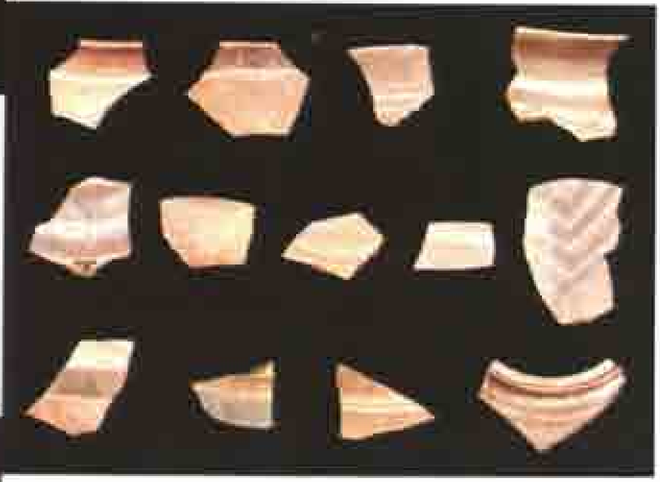
Dangi, Meham, Pl. 3: Vase From Bedwa-II (Burial pottery)



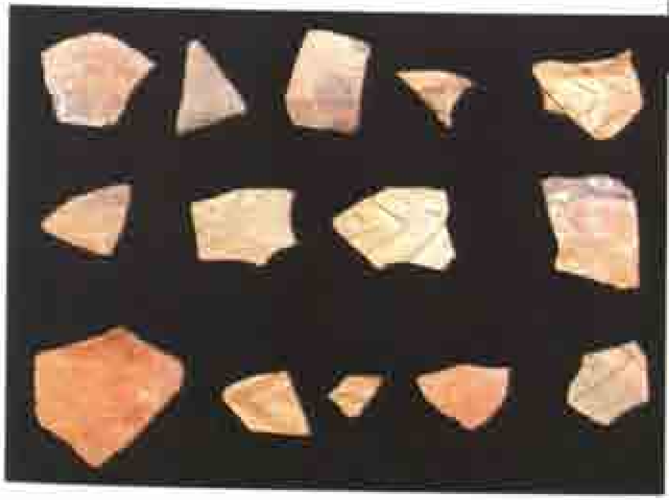
Dangi, Meham, Pl. 4: Copper objects from Farmana-I



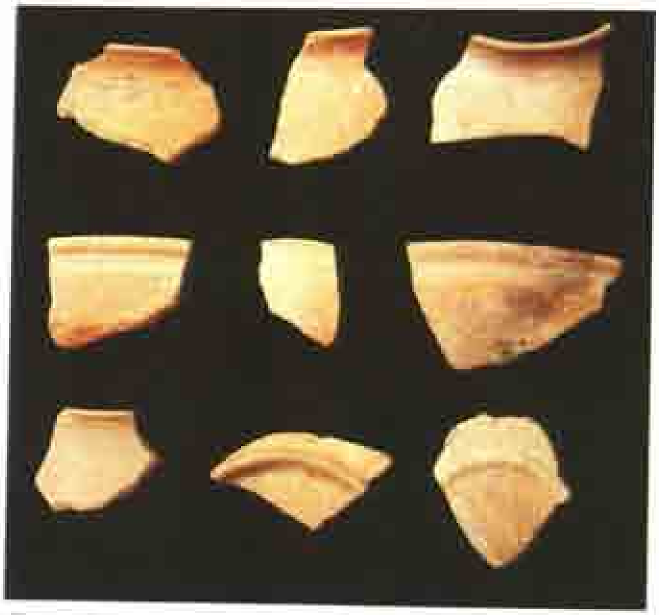
Garge, Pl. 1: Red Slipped Ware with Monochrome (black) paintings, Early Harappan, Sothi, Rajasthan



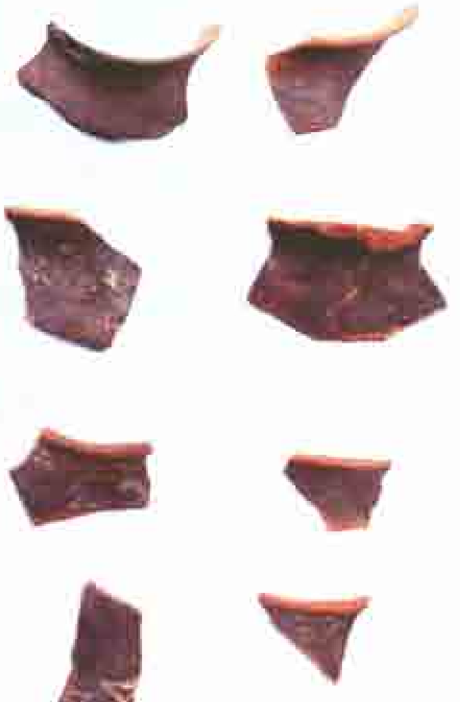
Garge, Pl. 2: Red Slipped Ware with Bichrome (black & white) paintings, Early Harappan, Sothi, Rajasthan



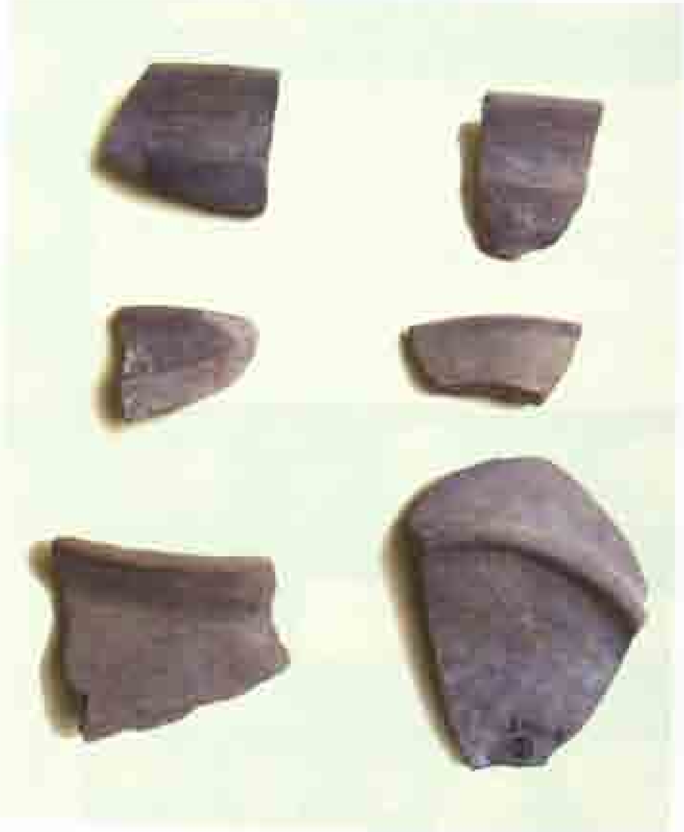
Garge, Pl.3: Incised Red Ware, Early Harappan, Sothi, Rajasthan



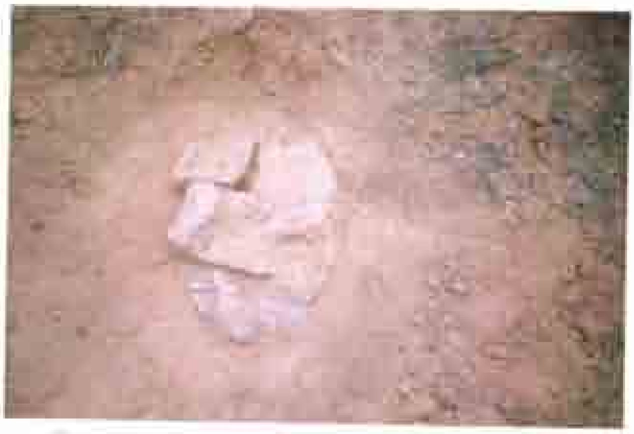
Garge, Pl.4: Plain red Ware, Early Harappan, Sothi, Rajasthan



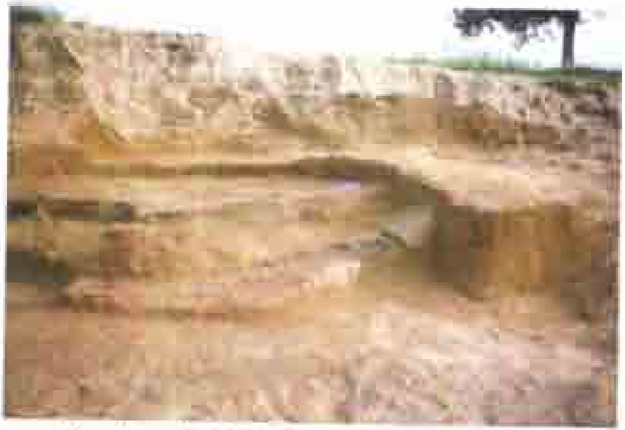
Garge, Pl.5: Black/ Chocolate Slipped Red Ware, Early Harappan, Sothi, Rajasthan



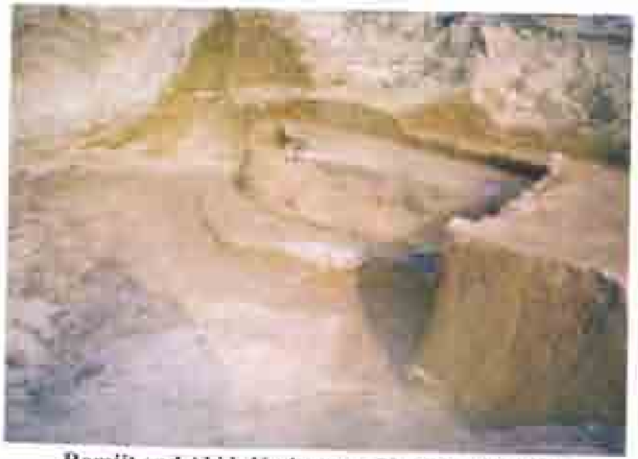
Garge, Pl.6: Grey Ware, Early Harappan, Sothi, Rajasthan



Ramjit and Abid, Keshavpur, Pl.1: Sacrificial altar



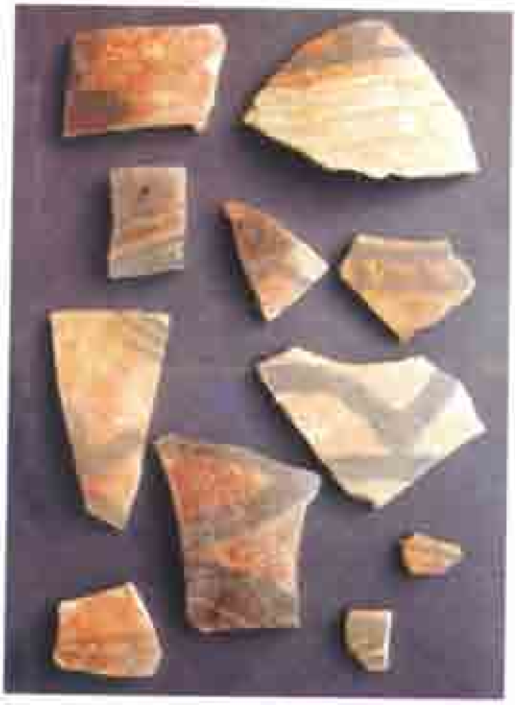
Ramjit and Abid, Keshavpur, Pl. 2(a): Brick kiln

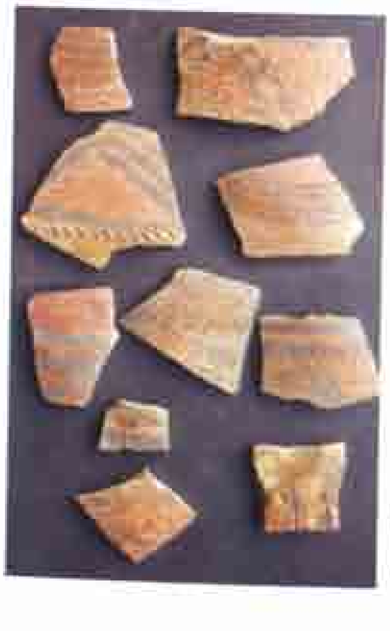


Ramjit and Abid, Keshavpur, Pl. 2(b): Brick kiln

▶

Ramjit and Abid, Keshavpur, Pl. 3(a): Painted Red ware

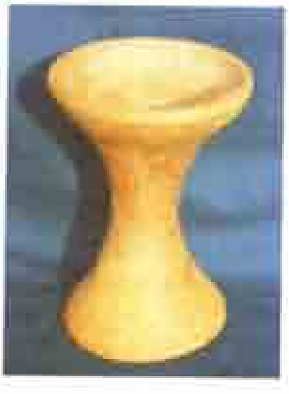


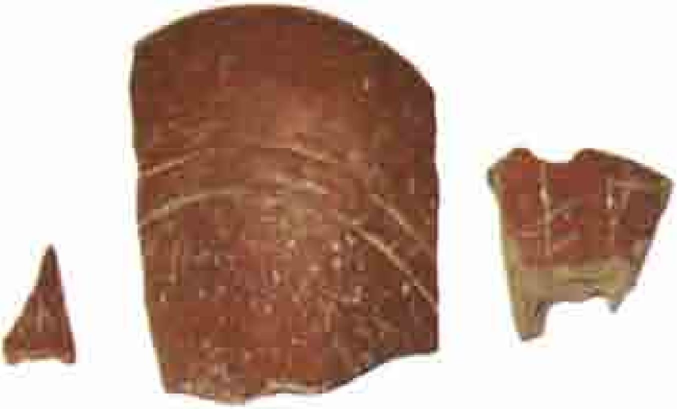


Ramjit and Abid, Keshavpur, Pl. 3(b): Painted and incised Red ware

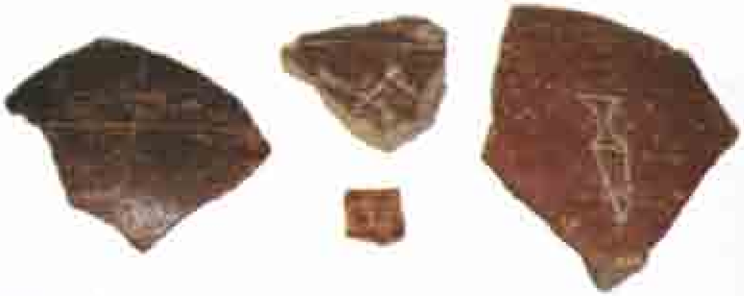
▶

Ramjit and Abid, Keshavpur, Pl. 4: Offering stand from lowest level

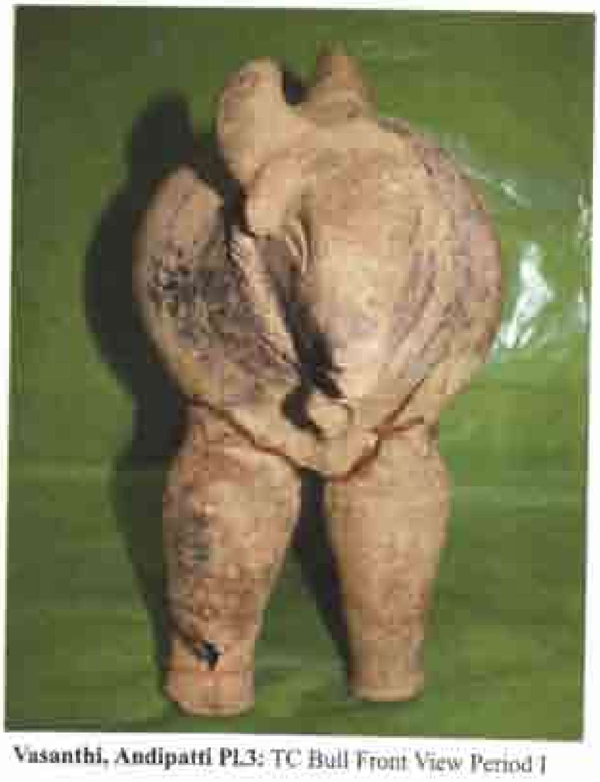




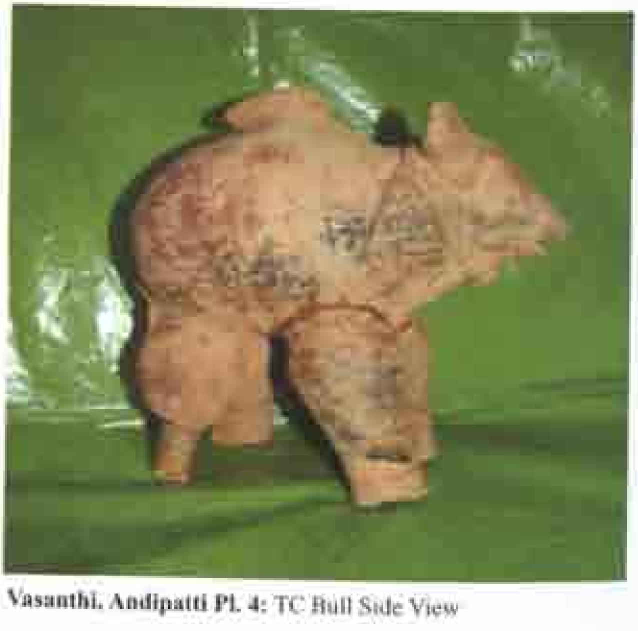
Vasanthi, Andipatti Pl. 1: Inscribed potsherds period I



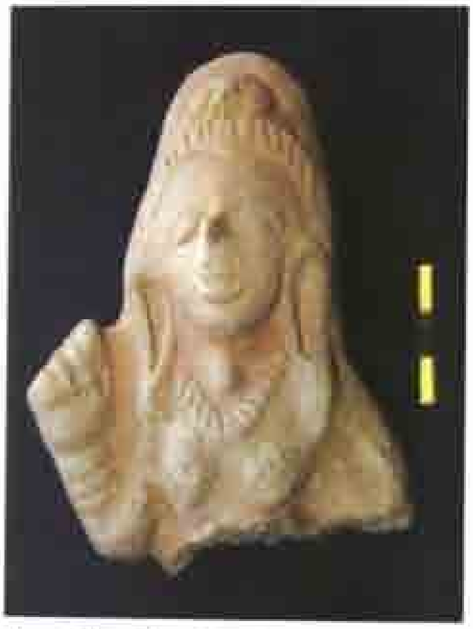
Vasanthi, Andipatti Pl. 2: Potsherds with graffiti period I



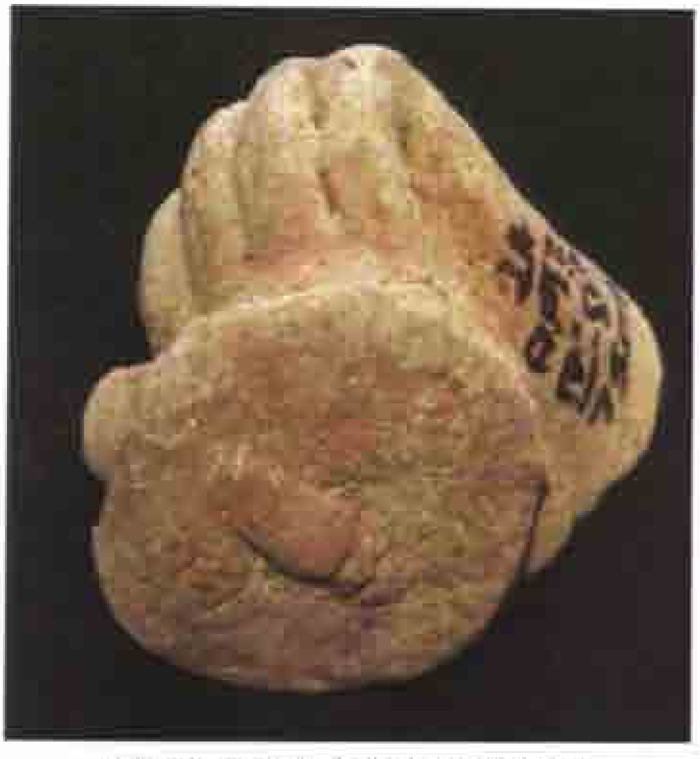
Vasanthi, Andipatti Pl.3: TC Bull Front View Period I



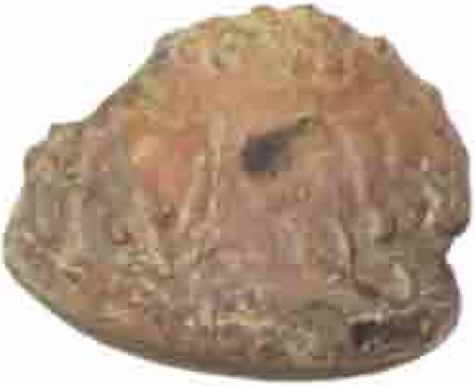
Vasanthi, Andipatti Pl. 4: TC Bull Side View



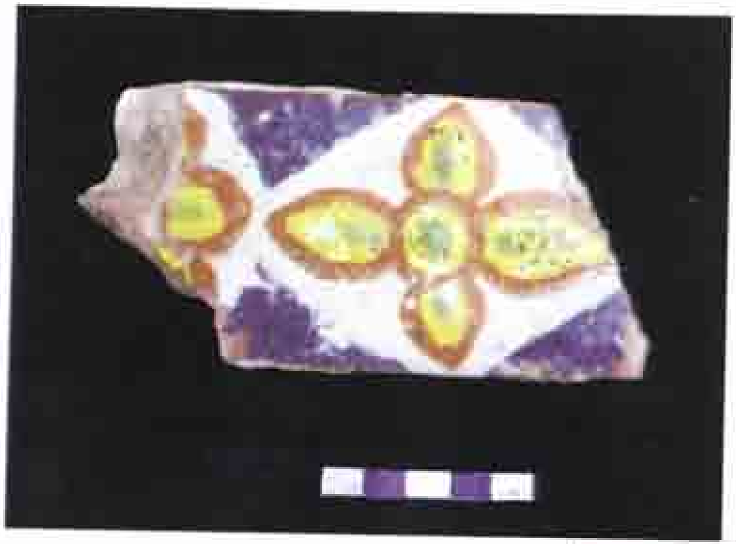
Vasanthi, Andipatti, Pl. 5: TC Mother Goddess



Vasanthi, Andipatti , Pl. 6: TC Handle Period I



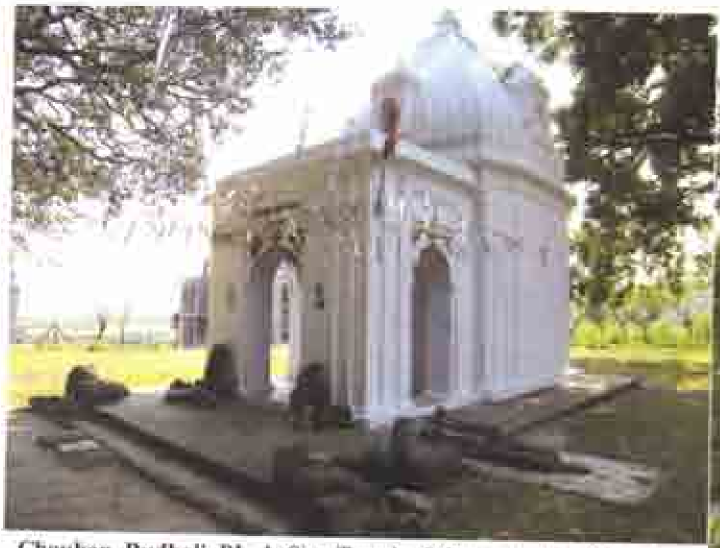
Vasanthi, Andipatti Pl. 7: TC Ornament Stand



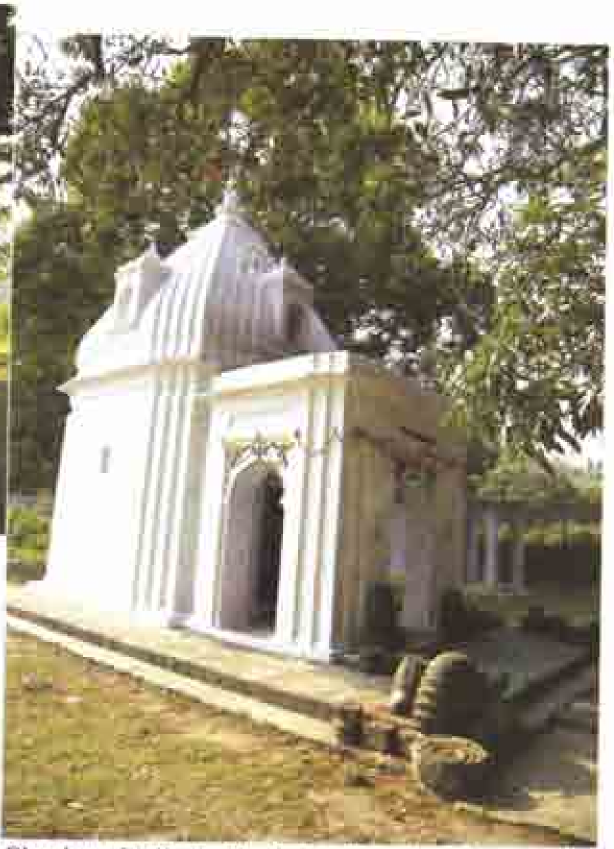
Ghosh *et al.*, **Pl. 1:** Polychrome Glazed Brick from Gaur

Ghosh *et al.*, **Pl 2:** Samples for DTA and XRD

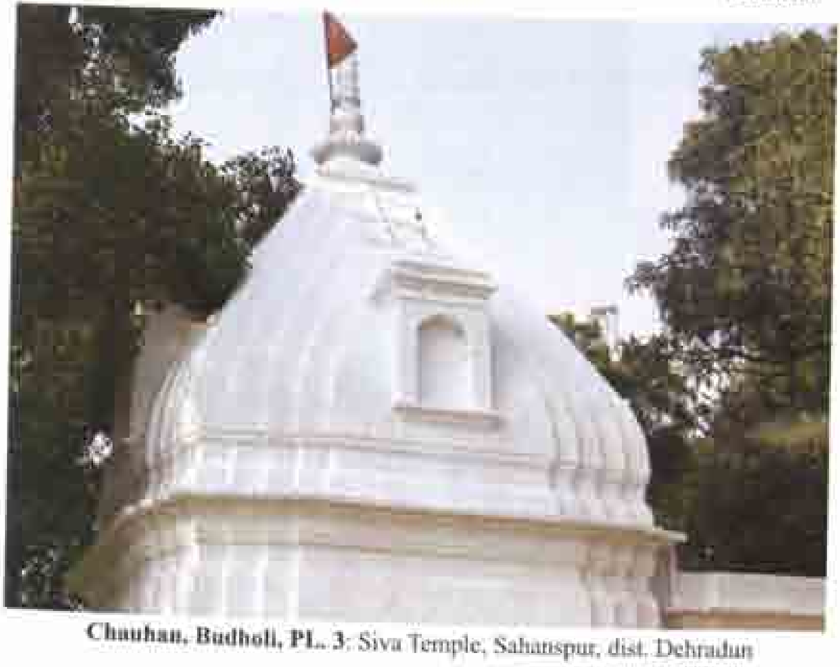
Ghosh *et al.*, **Pl. 3:** Powdered glaze for AAS



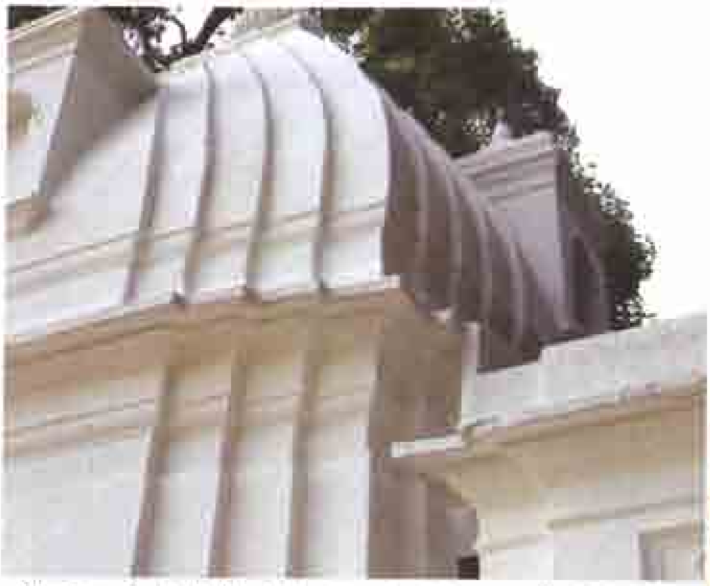
Chauhan, Budholi, PL. 1: Siva Temple, Sahanspur, dist. Dehradun



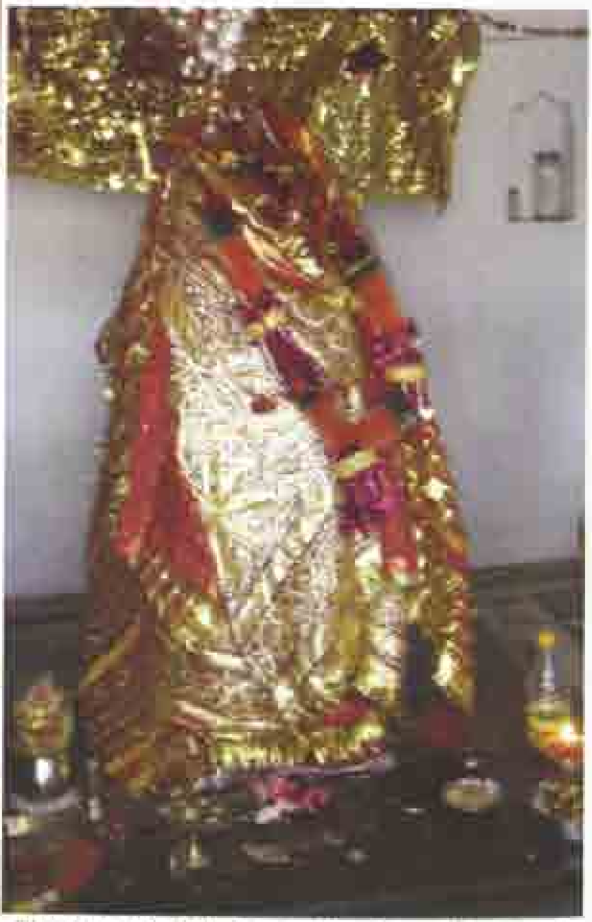
Chauhan, Budholi, PL. 2: Siva Temple, Sahanspur, dist. Dehradun



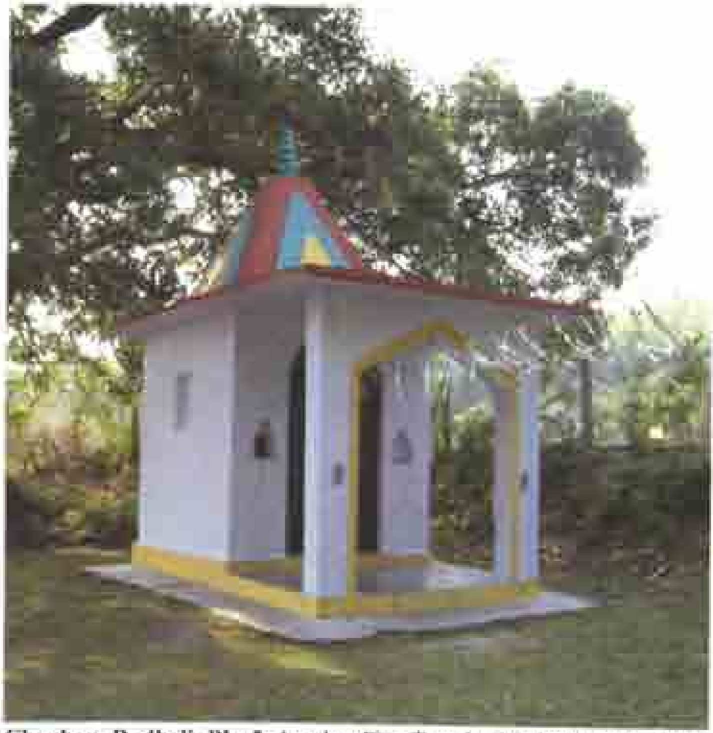
Chauhan, Budholi, PL. 3: Siva Temple, Sahanspur, dist. Dehradun



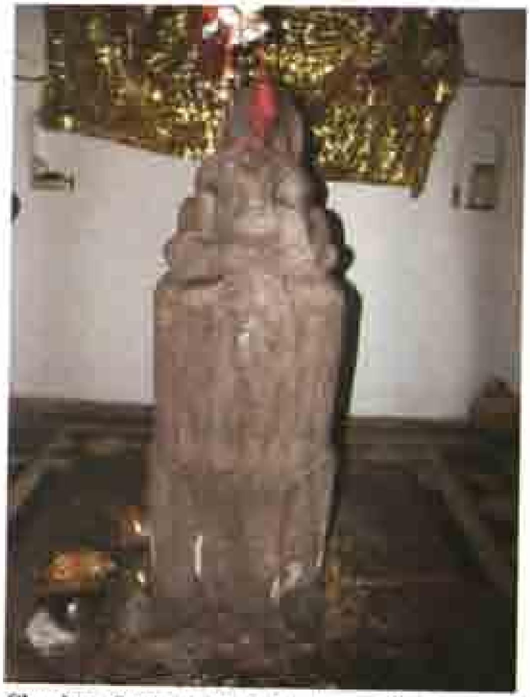
Chauhan, Budholi, PL. 4: Siva Temple, Sahanspur, dist. Dehradun



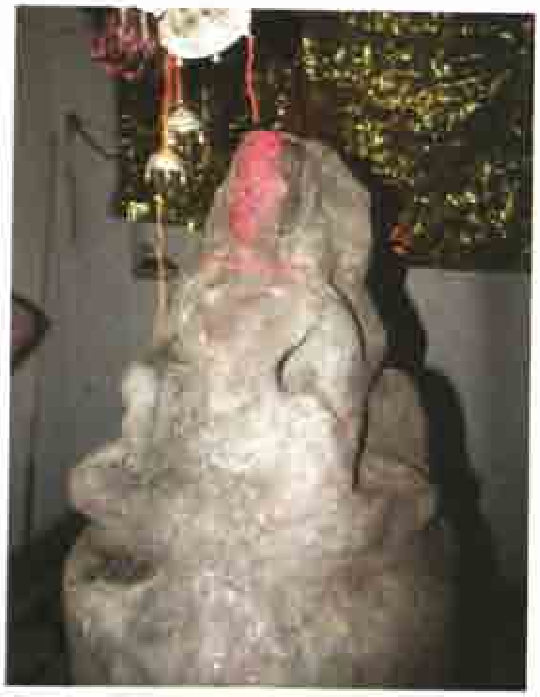
Chauhan, Budholi, PL. 6: Siva linga, Siva Temple, Sahanspur, dist. Dehradun



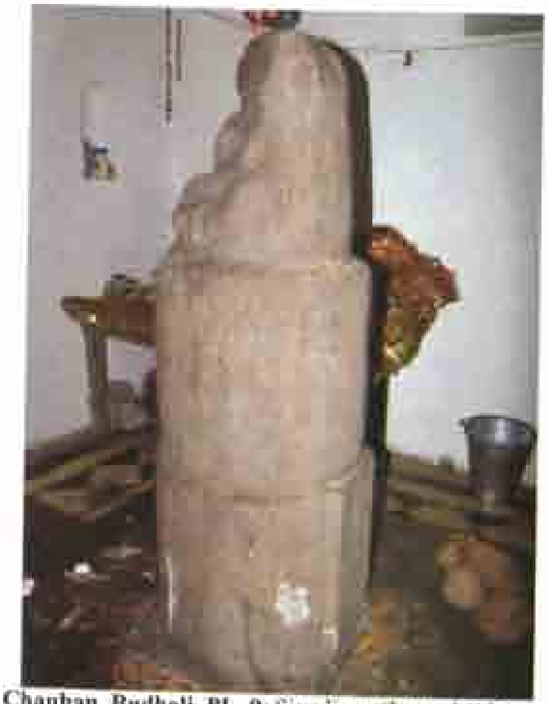
Chauhan, Budholi, PL. 5: Another Siva Temple (Modern), Sahanspur, dist. Dehradun



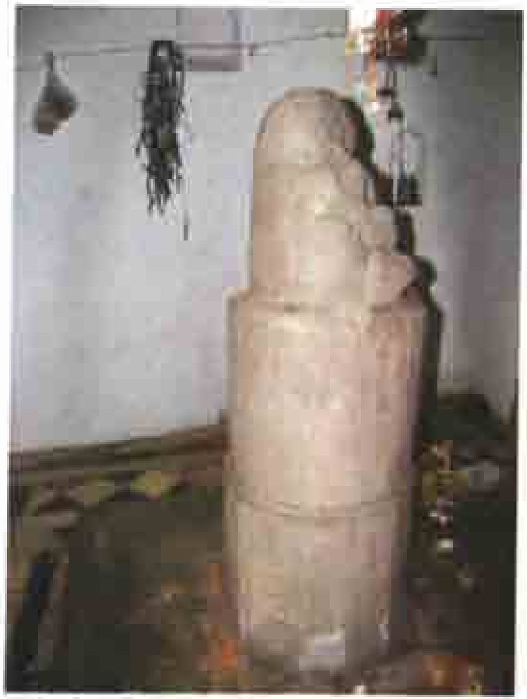
Chauhan, Budholi, PL.7: Siva linga, Siva Temple, Sahanspur, dist. Dehradun



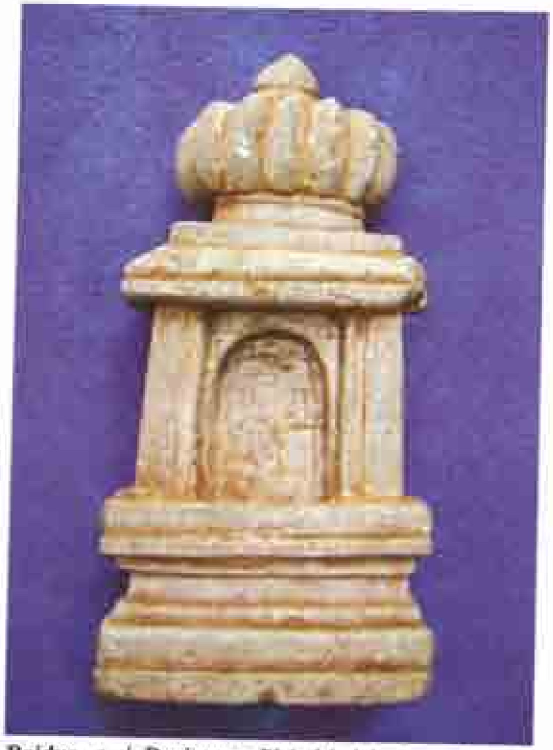
Chauhan, Budholi, PL. 8: Siva linga, Siva Temple, Sahanspur, dist. Dehradun



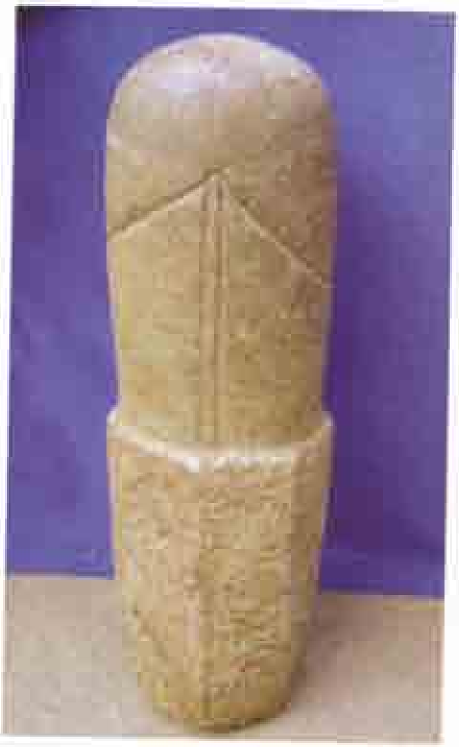
Chauhan, Budholi, PL. 9: Siva linga (Lateral side), Siva Temple, Sahanspur, dist. Dehradun



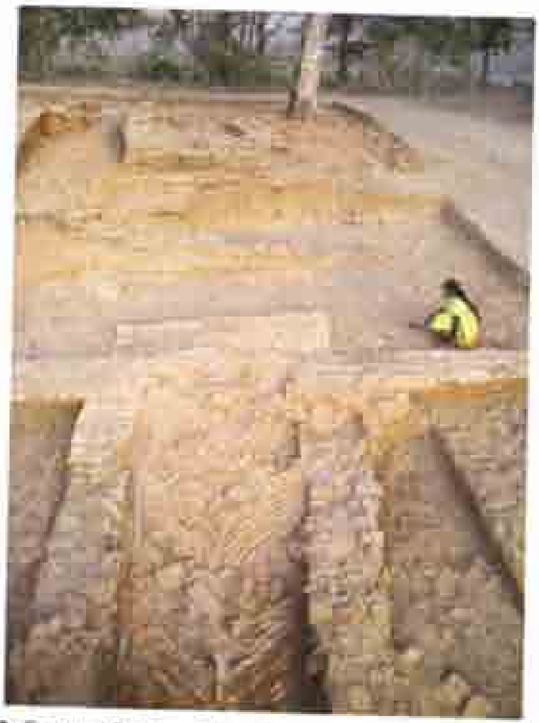
Chauhan, Budholi, PL. 10: Siva linga (Lateral side), Siva Temple, Sahanspur, dist. Dehradun



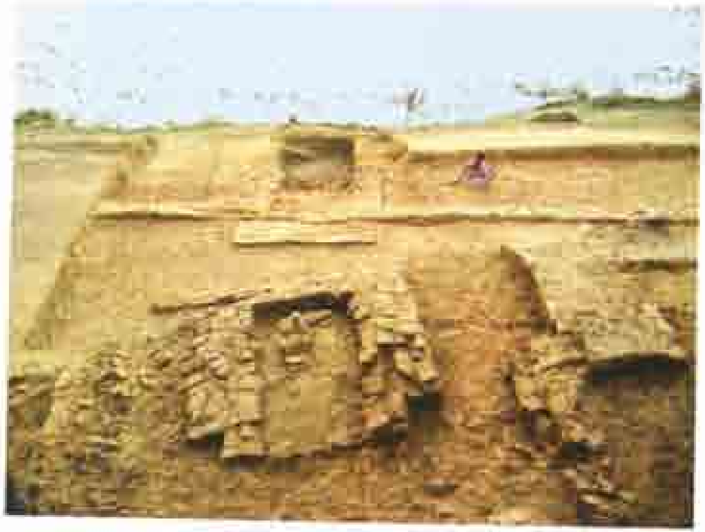
Baidya *et al.* **Benisagar, Pl.1:** Model of temple with prominent Amalaka (Scientific Clearance 2006-2007)



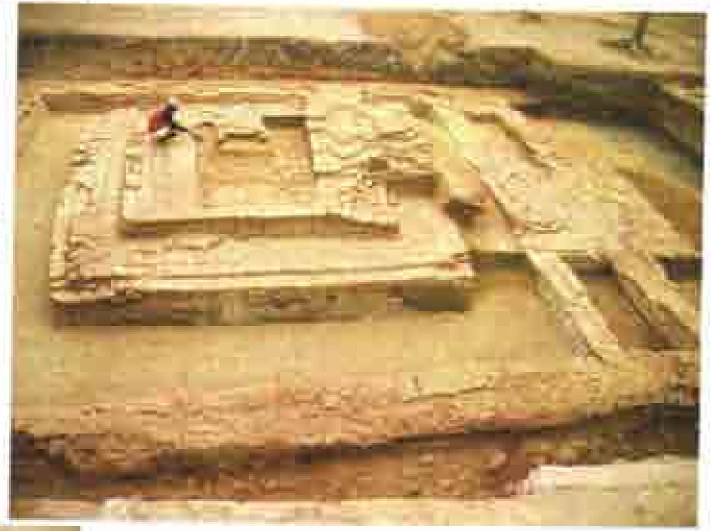
Baidya *et al.* **Benisagar, Pl.2:** Exposed Shivalinga (Scientific Clearance 2006-2007)



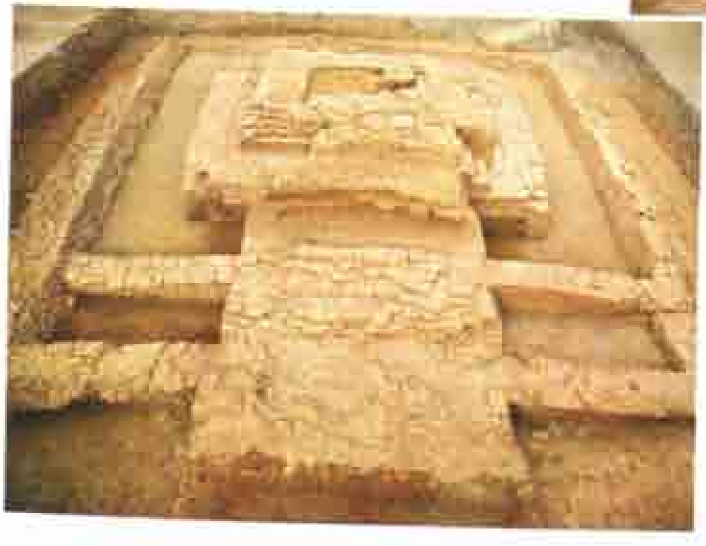
Baidya *et al.* **Benisagar, Pl.3:** Exposed Bathing Ghat with small brick temple (Scientific Clearance 2006-2007)



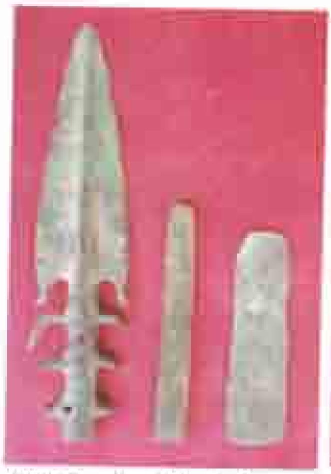
Baidya *et al.*, **Benisagar, Pl.4:** Exposed small temple with Shivalinga (Scientific Clearance 2006-2007)



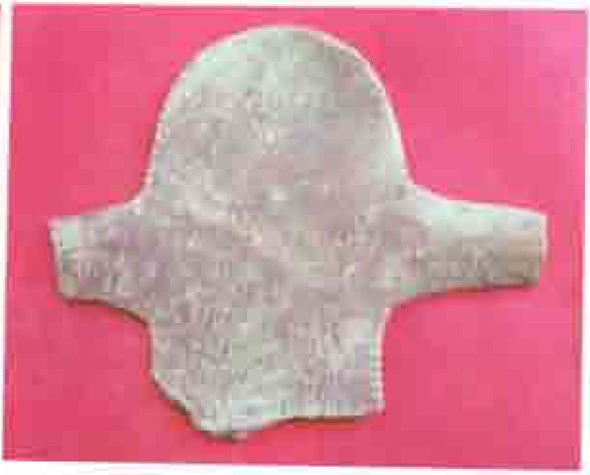
Baidya *et al.*, **Benisagar, Pl.5:** Brick temple exposed on the island of the tank (View from the southern side) (Scientific Clearance 2006-2007)



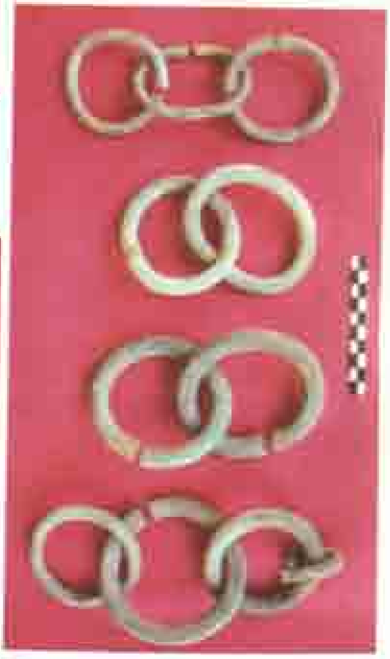
Baidya *et al.*, **Benisagar, Pl.6:** Brick temple exposed on the island of the tank (View from the eastern side) (Scientific Clearance 2006-2007)



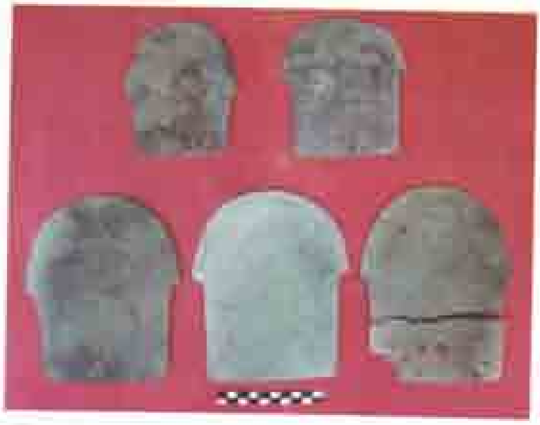
Tewari, *et al.* **Pl. 1:** Copper harpoon and chisels, Udaipurwa Copper Hoard, district Auraiya, U.P



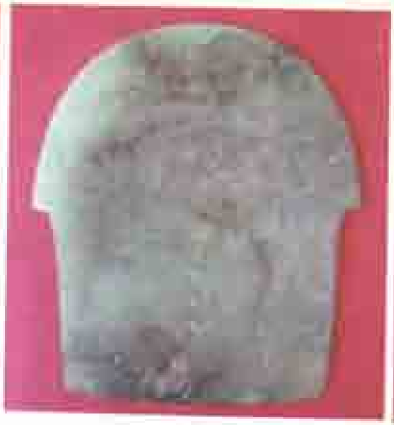
Tewari, *et al.* **Pl. 2:** Anthropomorphic figure, Udaipurwa Copper Hoard, district Auraiya, U.P



Tewari, *et al.* **Pl. 5:** Copper rings, Udaipurwa Copper Hoard, district Auraiya



Tewari, *et al.* **Pl. 3:** Copper axes, Udaipurwa Copper Hoard, district Auraiya, U.P



Tewari, *et al.* **Pl. 4:** Shouldered copper axe bearing circular depressions, Udaipurwa Copper

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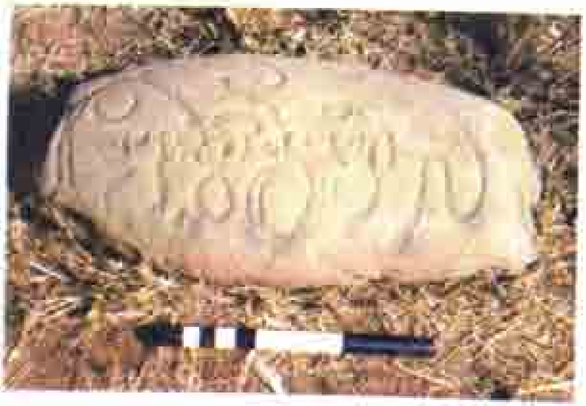

Pramanik, Pl.1: *Shank lipi*